FOOD MANUFACTURE

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

World Food Situation

BY THE time this issue is published the conference of the United Nations Food and Agriculture Organisation (FAO) will have been inaugurated in Quebec. Details of the first session will arrive too late for inclusion in this issue.

In the meantime a report on the world food situation has been issued by the U.S. Department of Agriculture in which is disclosed the widespread need for food imports.

With food supplies for 1945-46 estimated at substantially less than the pre-war level in the United Kingdom and Europe, Britain and all European countries, with the exception of the Soviet Union and Czechoslovakia, will be largely dependent on imports during the coming year.

In Britain the farm output of food crops would be about 10 per cent. less in 1945-46 than last year, although the production of livestock products might be about 5 per cent. larger in terms of calories. Because of a decline in wheat production in 1945, however, and a reduction in the reserve stocks of food, the United Kingdom would be more dependent next year upon imports.

A notable exception to the general shortage was Eire, where prospects for the current harvest were favourable. Eire had appropriated about £3,000,000 for clothing, food, and livestock to be sent to the relief of the Continent.

Of the European countries, France would probably reach a five-year low in 1945-46, and 1,900,000 tons of wheat and 330,000 tons each of sugar and fats would be needed to approach the pre-war level of consumption.

Belgium, the Netherlands, Greece, Poland, Austria, Italy, and the Balkan countries of Hungary, Rumania, Albania, and Bulgaria were all short of grain and certain other essentials, which would have to be imported.

In Norway and Finland food production was also well below pre-war levels, although Norway would be able to supply other countries with "very large amounts of fish."

In Germany domestic food supplies were deficient in both the western and eastern zones, but the situation was more serious in the eastern (Russian-occupied) zone.

In the eastern zone imports of about 4,500,000 tons of wheat, fats, sugar, and dry vegetables would be required, and in the western zone another 550,000 tons of wheat.

In the Soviet Union, despite certain shortages, the current food situation was slightly improved, while Czechoslovakia would be relatively well off, due to an excellent harvest this year.

Sugar Allocations

Mr. Anderson, the United States Secretary for Agriculture, has announced that 1,600,000 tons of sugar have been found in Javanese ports since the Japanese surrender. This sugar, he states, would be added to the United Nations' pool.

The quantity represents 86 per cent. of the estimated deficit in the United Nations' requirements to the end of 1945. That estimate was drawn up at an inter-Allied conference held in Washington in the spring. Details were given by Col. J. J. Llewellin, then Minister of Food, at a Press conference last May. He said that the estimated supply from current production to the end of the year was 8,067,000 tons, and that the estimated requirements amounted to 9,920,000 tons, leaving a deficit to the end of the year of 1,853,000 tons.

He doubted whether the actual supplies would reach the estimate, and the reduction in the sugar allocations of a number of food-manufacturing industries from September 16 suggests that that doubt has proved only too true.

The improved position will not permit of an early restoration of any part of cuts in the allocations to food manufacturers; in fact, the Ministry of Food have stated that the sugar position had worsened to such an extent since the spring estimates were drawn up that it is only as a result of the Java windfall that the present allocations to manufacturers can be maintained.

Disabled Persons

The Register of Disabled Persons, provided for in the Disabled Persons (Employment) Act of 1944, was opened on September 25. This measure will, at an early date, impose new obligations on food manufacturers in common with employers in other industries, for it *compels* employers to give employment to disabled people.

The Act covers disablement of every type, whether due to war service (in this war or a previous one), accident, congenital disease, or other cause. It applies to everybody "who on account of injury, disease, or deformity is substantially incapacitated in getting or keeping suitable work," though preference in submissions for work will be given to ex-Servicemen.

The Register is a voluntary one, but it is hoped that as many as possible of the men and women affected will register, whether they are now in employment or not. Applications for admission to the Register must be made on the appropriate form obtainable from any local office of the Ministry of Labour.

As soon as the Register has been established, the Minister will fix a quota of disabled persons which every employer of 20 or more workers will be under an obligation to employ. At the outset the quota will be low, and it will be revised from time to time as may be desirable.

The number of persons affected by the Act may be about 1,000,000. There are 350,000 disabled of the 1914-18 war, and at least 360,000 of the 1939-45 war. The Register will remain open permanently. Where there is any doubt about the entitlement of an applicant to have his name placed on the Register, the case will be referred to the Disablement Advisory Committee for the district. Disablement must be such that it is likely to continue for at least six months after the date of registration. Ex-Servicemen disabled in the 1914-18 war are regarded automatically as fulfilling the necessary conditions.

When the scheme is in working order, an employer who has less than his quota of disabled workers will have to obtain a permit from the Minister of Labour in order to engage a person who is not registered as disabled, unless that person is a former employee entitled to reinstatement. The Act also gives the Minister power to designate certain classes of employment for the special benefit of disabled persons.

Bracken Problem

The successful reclamation of hundreds of acres of North Yorkshire moorland, whereby both crops and stock are now carried by a one-time waste, is one more attack against the old enemy, "the interminable fern root," as farmers have called bracken. It has always been a serious agricultural pest, not only reducing grazing land but furnishing cover for the maggot-fly attacking sheep, and reducing the area of sheep-run covered by each shepherd and dog. The Ministry of Agriculture, the Leeds University Agricultural Department, and other bodies have been much concerned with the problem. A leaflet of the former, remarking that bracken "is poisonous to horses and cattle to a degree as yet undetermined," is in contrast to reports that cattle, when permitted, will make short work of bracken tips, and to an old use when dried as "hay" for horses. Motor bracken-crushers now supersede the old mowing-machine and scythe in the struggle, so that in such instances as the Goathland Hydro farm the re-seeding with grass in 1943 enabled a three-acre field to be grazed by eight milch cows and five bullocks, sustaining these for six weeks when ordinary pastures were poor.

Yet the food world must not entirely condemn bracken as useless. Many growers found it of

value for packing apples and cherries; the Isle of Man saw it used in packing fish. In Normandy and elsewhere the "esculent brake" provided food for man. And there are such old uses as boiled roots for pigs, and the inclusion of one part to two of malt in brewing beer!

Discoloration of Potatoes

Two types of discoloration encountered in the dehydration of white potatoes in Maine, U.S.A., are described in an article by A. Frank Ross, M. T. Hilborn, and Lyle C. Jenness (*The Food Packer*, September, 1945). They were a reddish-brown discoloration, sometimes referred to as scorch or heat damage, and a grey discoloration.

The first type was found to be due to the use of potatoes high in reducing sugars, together with the use of high temperatures during the last stages of dehydration. Carefully controlled drying conditions have, in the past, been the means of preventing heat damage, but the best method of control is to use potatoes low in reducing sugars, preferably with less than 3·0 per cent. (of the dry weight).

Sulphiting will prevent this type of discoloration in most cases, but in view of the effect of reducing sugars on the storage life of the packaged product, sulphiting should not be relied upon as the sole method of control.

The second type found was a grey discoloration that developed in the partially cooked zone of steam or lye peeled potatoes before blanching. This trouble was found to be due to the use of potatoes showing internal injury, caused by certain diseases or other agents.

The control methods recommended include a rigid inspection of the raw material before buying, generous and rapid trimming, and warming the potatoes in hot water before they are peeled. The function of the latter treatment is to ensure adequate heat penetration to blanch the affected area (vascular ring) without producing excessive peeling losses.

Electronic Blanching of Vegetables

The use of electronic heat in lieu of steam or boiling water has been suggested by James C. Moyer and Elmer Stotz of N.Y. State Agricultural Experimental Station. It was thought that texture might be improved and losses in vitamin content due to leaching greatly reduced, if not eliminated, and further, through the use of high frequency electricity it might be possible to place the washed fresh vegetables in the final retail cartons, pass them through a high-frequency field for enzyme inactivation, and thence into the freezer. Such a procedure would eliminate much handling and possible attendant contamination of the vegetable before it reached the consumer in the frozen state.

Experiments conducted on the heating of cabbage with an oscillator having an output of 750 watts at a frequency of 150 megacycles have shown that there is little tendency of arcing between the electrodes and any projecting vegetable tissue if the vegetable is tightly packed into the container.

In testing the effectiveness of dielectric heating, heads of cabbage were cut into slices one-eighth of an inch thick and the shredded material packed into Peters-type cartons commonly used in the freezing of vegetables. A carton of shredded cabbage was placed between two copper electrodes mounted in an electric air oven. Tuning stubs were attached to the electrodes to eliminate standing waves and assist in coupling the load to the oscillator. An oven temperature of 100° C. was used to prevent the condensation of moisture on the electrodes and counteract heat losses from the carton by radiation. A heating period of two to three minutes was sufficient to raise the temperature of 180 grams of cabbage to 99° C.

The nearly negligible loss of ascorbic acid during electronic blanching in contrast to the 30 to 40 per cent. losses occurring in the steam and water processes points the way to the production of processed vegetables of higher nutritive value. Other vegetables have been successfully blanched by electronics, and more extensive studies of the value of dielectric heating for the inactivation of enzymes in fruit and vegetables are in progress and will include storage trials.

Effects of Manuring on Vegetable Quality

Two papers (*Proc. Amer. Soc. Hort. Sci.*, Vol. 44, 1944, pages 462-464 and 465-467) by H. D. Brown, Mary K. Miller, Ruth D. Schulkers, and others, of Ohio State University, deal with effects of mineral deficiencies and other aspects of manuring on carotene, appearance, flavour, and other manifestations of quality in several green vegetables and carrots. The intentions were good, and some of the information breaks new and promising ground, but the papers do not upset the tradition that work on the relation between manuring and quality of crops must be scrappy and in part obscure. The authors of the first paper follow the lax American custom of recording percentages as content, apparently without realising that a high figure for carotene per 100 grams of vegetable may mean a low content or total yield of carotene if the gross yield of produce is reduced; and conversely. It is sometimes difficult to ascertain what treatment was actually applied. It appears to be established, at least for the greenhouse conditions stated, that carotene percentage in leafy vegetables is positively associated with the greenness of the plant; any manurial lack which brings about a yellowing of the leaves reduces the carotene percentage in them. Almost the highest figures for carotene per-

centage were obtained with phosphate-deficient kale, mustard, and beet tops, all of which were dark green, presumably owing to a stunting of the plants, leading to a concentration of pigments; but as high a value was obtained from kale abundantly supplied with nitrogen, which was also dark green and presumably gave much higher total yields. The authors do not claim more than that the determinations show possible trends. The second paper, devoted to field-grown carrots, shows the beneficial effects of rapid growth upon quality; rapidly grown roots had much better colour and taste and apparently more carotene than those grown slowly and with a check. "Floaters" were common in the latter and absent in the former. It is interesting that the average refractive indices of juice in the floaters were always slightly lower than in non-floaters of the same age. The refractive indices of the quickly grown roots were appreciably the highest of all, the difference between the refractive indices of rapidly grown roots (none of which floated) and the non-floaters of the other group being much greater than any difference between floaters and non-floaters of slow growth. The refractive index may thus be a useful single-value guide to carrot quality.

No Standard

Last month FOOD MANUFACTURE had occasion to comment upon an "unstandardised standard" for a food product. There was a recent prosecution against a firm for selling curry powder adulterated by the inclusion of an excessive amount of salt and pea or bean flour. It emerged during the course of the proceedings that in the case of curry powder there is no standard at all. The defence relied on "the absence of evidence from the trade as to what the man in the street expected when he bought curry powder."

Much discussion ensued as to the amount of "diluent" allowable. Mr. Thomas McLachlan, giving expert evidence, said that since January, 1942, he had examined 118 samples of curry powder and had found only 12 containing more than 10 per cent. of diluent or anything outside spices. He had never found pea or bean flour in the product before the war, but since then there had been a tendency for imported curry powder to contain anything up to 25 per cent.

In this particular case, the magistrate, dismissing the prosecution, said he thought that curry powder ought to consist of more than 76 per cent. of spices, and he found that the defendants had proved that when they gave the written warranty they had no reason to believe that the description of the article was not accurate, especially as from time to time they had had their purchase tested and had not received any serious complaints about it.

The records of food prosecutions during the war years contain a variety of cases apart from those resulting from a barefaced cashing-in on existing scarcity. Fortunately, the latter class is comparatively rare—this country is blessed with a food industry notable for its honest dealings and the efficiency of its methods, but it is handicapped by the unsatisfactory state of the law. It is obviously absurd to "pass the buck" to the man in the street, and it is manifestly unfair to put all defendants in food prosecutions in the same class.

Judging from the report of the curry powder prosecution, it looks as if the manufacturers in Madras, India, have sought extra profit in adding large quantities of diluent to their spices, and it is significant that this has only been done during the war.

"More standards" mean "more control," but we do not think that the most rabid opponents of control will object to this species.

Hot Dogs

Since grumbling over food, or the lack of it, has been a perpetual standby of Mr. Everyman when his liver—his own liver, that is—rouses him to action, it is hardly surprising that in years of war and newly fledged peace some "grouse" at table has been in evidence. Complaints have ranged from dyed kippers and radishes that have lost their tang or "kick," to the absence of those "lend-lease shrimps" which were promised to be as large as "pre-war prawns." Hence it is to be expected that the perennial target, the sausage, should be often in the news.

The definition of news is that "man bites dog." But in Coney Island this is now modified to man failing to bite hot dog. Holiday crowds at that resort have bitterly complained about the scarcity of frankfurters, that standby of which the American nation consumes annually a mere 10,000 million. Salami, peperoni, mortadella, Bolognas, and capicolli: the people of the West know these and many more disguises of the sausage. But frankfurters, whether the original kind the length of a finger and composed of raw lean pork and beef well smoked, or the austerity kind, are gone temporarily, since the United States Government has ordered the setting aside of the chief ingredient of 60 per cent. "bull meat" for the Forces. Yet perhaps our American friends instead of complaining should change the spices and find a substitute, particularly in the Isle of Coneys! Let them think of the plain British wartime sausage sustaining us in the trivial round and common task. Or of Germany when the British Navy seized as contraband those hogsheads of Chinese sausage-skins and caused much sighing in the land of Fritz where the "sausage-dog" is much in evidence. Worse than the kipper with its cosmetics is the sad sausage with no skin to dye. And worse still is when there is no sausage at all, as is the case now in many parts of Europe.

Is "New Canning System" Practicable?

Considerable interest has been aroused in the United States by the article "A New Canning System" published in FOOD MANUFACTURE, May, 1945. With a view to determining whether the container and method of processing described might prove practical in American meat plants, the editor of *The National Provisioner* submitted the article to one of them, whose research experts studied the question carefully and arrived at certain conclusions. Their views and the replies of the author of the article are given below.

ONE of the features of the new canning system is a drawn, seamless can of considerably greater dimensions than has hitherto been deemed practicable.

Drawn Seamless Cans

U.S. Canner.—*Drawn seamless cans of the type described are not new and have been used for packing such items as sardines for many years. It has not been considered practical to make these containers deeper than 1¼ in., whereas the containers described in the British article are 2½ in. deep, or twice the generally accepted maximum depth. Most of the materials recommended for this type of package are considerably more expensive than tinplate. Also, according to authorities on the subject, steel made in the United States is not suitable for the manufacture of drawn cans because of its hardness. On the other hand, industrial steel made in England is of a softer type and better adapted to this type of manufacture.*

The Author.—Drawn seamless cans are not new, and, as U.S. Canner states, have been in use for many years, but to get sufficient capacity—*i.e.*, 16 to 20 oz. with only 1¼ in. depth—for general packing would make them cumbersome, ugly, and very difficult to pack, whereas the British can is compact, easy to pack, and attractive in appearance, particularly with meat contents.

It is agreed that the extra depth to 2½ in. is more difficult to obtain in normal presswork, but these difficulties have been overcome by incorporating a patent "Simplex" drawing device in the base of the body-forming tools, which allows depths down to 3 in. or more to be drawn in one stroke from the same quality tinplate or strip material as is used in sardine or pilchard tins.

The suggested alternative materials from which to make these special pressure-resisting cans have qualities not possessed by normal tinplate. For instance, a monel metal surfaced plate or strip, or a non-ferrous alloy plate or strip, would be impervious to corrosion, staining, or blackening by the products, and further would not need additional exterior protection by lacquer films to retain its original unblemished condition, ensuring freedom from many of the worries the packer experiences from the shortened shelf-life of his products under adverse climatic atmospheres—a relief for which a little extra cost would be well spent, particularly when catering for a speciality market with a high-class product. But beside this point this British can definitely may be produced from normal tinplate as made in U.S.A., and used by the packing industry for its ordinary drawn sanitary food cans, and equally as cheaply or cheaper, price for price, as the prefabricated or built-up can with its soldered lock-seam jointed body blank and separate spun-on double-seamed bottom. U.S.A. is the home of the continuous cold-rolled steel that is so suitable for can making.

Continuous Fabrication of Cans at the Packing Line

U.S. Canner.—*Fabrication of the cans continuously at the packing line definitely would be an advantage and is practised in this country on the conventional sanitary round can by such firms as the Campbell Soup Co. This method would be practical only where one or two cans of a given size are used in large volume; otherwise the investment in machinery would be entirely too great. The equipment described fabricates cans at a rate of 40 per minute, which is much too slow. For example, the luncheon meat canning lines of our packing-house turn out 250 cans per minute.*

The Author.—The can-making portion of the British plant has an output of only 40 cans per minute, and when compared with the output of the American meat-canning lines turning out 250 cans per minute seems totally inadequate, but when it is realised that the can-making portion of the British line consists of ONE machine as against the whole array of gang slitters, flapper mandrils, lock seamers, solder baths, flangers, double seamers, bottom presses, etc., to obtain this greater output, and that by placing five or six of the British machines together the same output can be obtained, the presumed drawback that the investment in machinery would be entirely too great cannot be

supported, as reference to press manufacturers' catalogues will confirm.

Group Packaging

Among the different novel features of the system described in the original article was the method of packing. Rows of cans stacked three or four high are put together in interlocking formations between shallow rectangular wooden trays or pressed metal outers and securely strapped together with steep tape, making complete units of 24, 36, or 48 cans ready for distribution or storage without using packing cases, wooden boxes, or cartons, and leaving the cans themselves visible for publicity purposes, but secure against pilfering.

U.S. Canner.—*The method of packaging groups of cans for shipment is unique, but objectionable because it exposes the containers directly to outside damage; also, the metal strapping used would make this method of packaging much more expensive than the conventional corrugated shipping container.*

The Author.—There is a risk that the containers may receive damage in transit by rough handling, but *revealed damage* may deter *concealed damage* in practice, and theoretically reduce its occurrence, which, if proved, would amply repay the saving in packing-case costs. Steel strapping is already extensively used in the industry to secure crates, cartons, and packing-cases from breaking open during transit and is an accepted safeguard and packing cost.

The British can being rectangular in shape and proportionate in block form—as distinct from round, shallow, and oval cans, which do not lend themselves to such stacking in solid blocks—presents a solid wall of sides and ends without crevices or interspaces, practically equivalent to the absent container sides that are dispensed with. In addition, the complete locking together of each can to its neighbour by the special novel cruciform corrugations in base and on lid entirely prevents subsequent misplacement or jostling out of position during transit, so that once they have been stacked up in the necessary layers and the top and bottom tray form outers placed around, the tightening pressure applied by the steel strapping automatically converts them into one solid unit or package, as rigid in its entirety as any nailed-up box or bonded carton, which will travel without disintegration or separation, except perhaps for minor indentation of some of the outer can sides from deliberate rough usage or inflicted damage, which might equally as well occur even through the sides of a protective carton or damaged crate.

There is another great publicity or sales telling advantage in the use of these outers instead of cartons or crates. They can be very cheaply mass produced by press stamping out of brightly coloured lithographed and coloured common plate, carrying the packer's brand designs, trade marks, and sales publicity matter at a cost far below the price of complete boxes or cartons.

Continuous Dry Heat Processing

U.S. Canner.—*Continuous dry heat processing is a new departure in the meat canning industry. Our concern has had no experience with it, but would anticipate considerable difficulty in maintaining a uniform temperature throughout the processing chamber. It has been our experience that we must remove all air from our retorts and either process in water or an atmosphere of steam in order to eliminate cold spots with resulting under-processing of some of the cans.*

The Author.—The method employed in the British dry heat processor ensures that there will be no cold spots from dead pockets as experienced in steam pressure retorts, as there is no confining of the heating medium to maintain pressure, but a rapid free circulation of air currents throughout the whole process time, through ducts to and from the heat source. Furthermore, the cans travel on moving conveyors through each heat zone during their journey, not remaining in any one spot or possible pocket, with the danger of under-processing.

Uniform temperature is not used throughout the dry heat processor. The cans pass through three regions of varying temperatures, the first being the highest where their contents can absorb heat most rapidly. The second region has a slightly lower temperature, while in the third is maintained the steady sterilising temperature and in which every can reaches and holds it for the required time before emerging, fully processed, from the exit.

All the zones have thermostatically controlled duct dampers regulating the inflow of the air currents from the heat source, and scavengering return ducts back to the heat source for recirculation.

Extensive tests have been carried out with this dry heat method using many varieties of products, including fruit, vegetables, meats, composite packs, etc., under the supervision of expert chemists and bacteriologists to observe its effectiveness, and samples submitted to independent laboratories for examination, incubation, and culture tests. The results have proved conclusively that the dry heat processing method properly applied is just as positive as steam pressure retort processing. In fact, in some instances, *e.g.*, soup, it was found that it actually improved the flavour over the normal steam retort method.

The initial high temperatures used when the contents enter the dry heat processor are absorbed without adverse effect, and the gentle turbulence produced by turning the cans over and over during their travel through the heat zones speeds up the rate of heat penetration and consequently reduces the overall processing time required to complete

(*Continued on page* 401)

Meat Dehydration in New Zealand

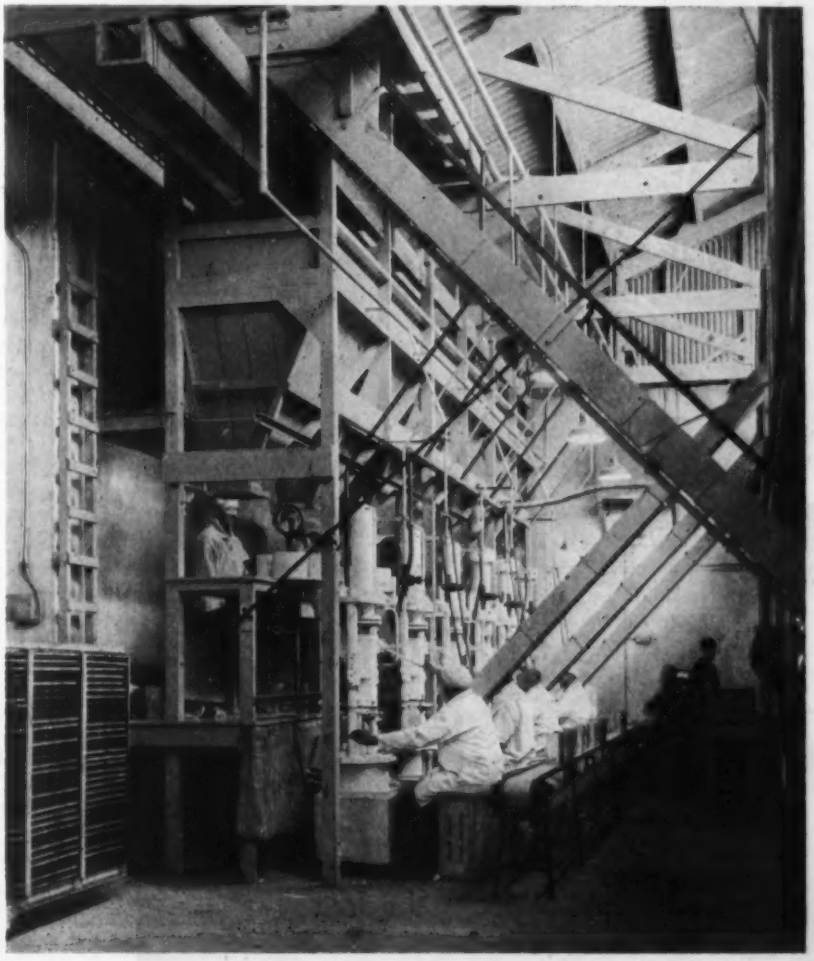
J. C. ANDREWS, M.Sc., Ph.D., F.N.Z.C.

AS THE result of the critical position which developed during the early years of the war serious consideration was given to the dehydration of meat. The initial experimental work was carried out at the Low Temperature Research Station at Cambridge. The results of these investigations were made available to the Dominions, and when the position became critical this work was so far advanced as to render practicable the commercial production of dehydrated meat.

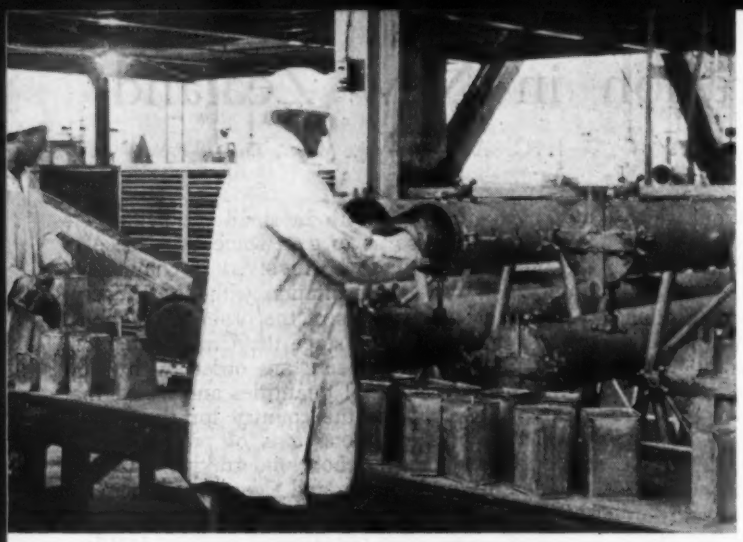
Dehydration of Exportable Surplus

New Zealand was requested, along with the other Dominions, to consider the possibility of dehydrating some of its exportable surplus. Some initial experimental work in small cabinet dryers was carried out so as to gain some experience of the problems likely to be involved in commercial production. After consultation with Dr. Vickery, of Australia, an analysis of the problems involved was made, and at this stage the United Kingdom Ministry of Food placed an order with New Zealand for commercial quantities and asked that plant be available in the country for the annual production of some 5,000 tons of product. The responsibility for the whole undertaking was then assumed by the New Zealand Department for Agriculture, and the author was requested to supervise the design and initial operation of suitable plant.

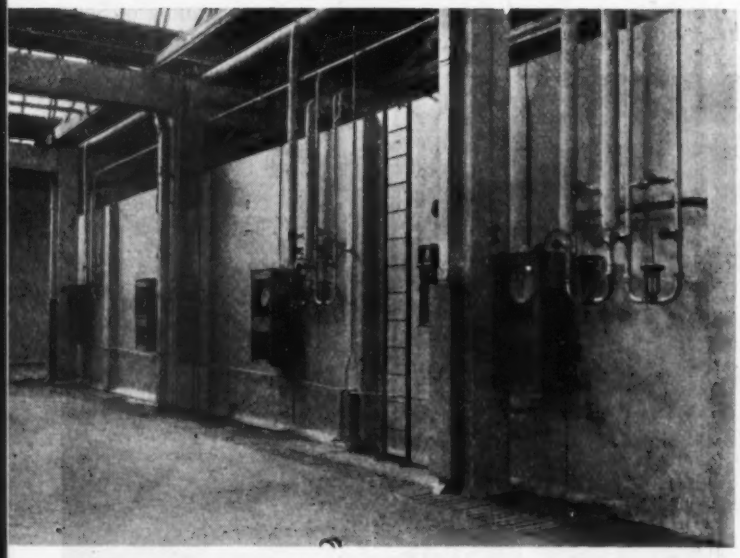
This decision was made at the beginning of September, 1942. The impossibility of procuring cer-



View showing pressing operations, empty can chutes, dried meat elevator, holding bins, and conveyor for filled cans.



View of exit end of can testers showing cans being removed.



Side view of dehydrator showing control valves and instruments.

Thawing vats, trim table, meat slicer, and cooking vats in background.

tain structural materials within the required period of time influenced the final form of the plant. One of the first decisions which had to be made was whether to erect a single factory with the required output at some central point, or to erect a number of small plants adjacent to slaughter-houses. The decision was finally made to erect one large factory at a central point on the following grounds:

(1) In view of the shortage of materials and labour it was generally considered that the erection of one unit would be the most practicable solution.
(2) By having the production concentrated in the one factory there was more likelihood of achieving an even standard of quality.
(3) The technical staffing of one unit did not place so severe a strain on technical personnel as would have been the case with a number of small units.
(4) On account of the large number of slaughter-houses in the Dominion it would have been impracticable to have erected dehydration plants adjacent to each slaughter-house.
(5) As the surplus meat slaughtered in the Dominion is immediately frozen for export, and since each of these slaughter-houses was provided with suitable freezing space, it was considered practicable to transport the frozen meat to the central dehydration factory. There was no experience, however, as to the results obtained from the dehydration of frozen meat, and work had to be done to determine whether the product from frozen meat was inferior to that produced from fresh meat. Investigations showed that, where the frozen product was not kept in cold store for any great length of time, there did not appear to be any appreciable breakdown in quality.

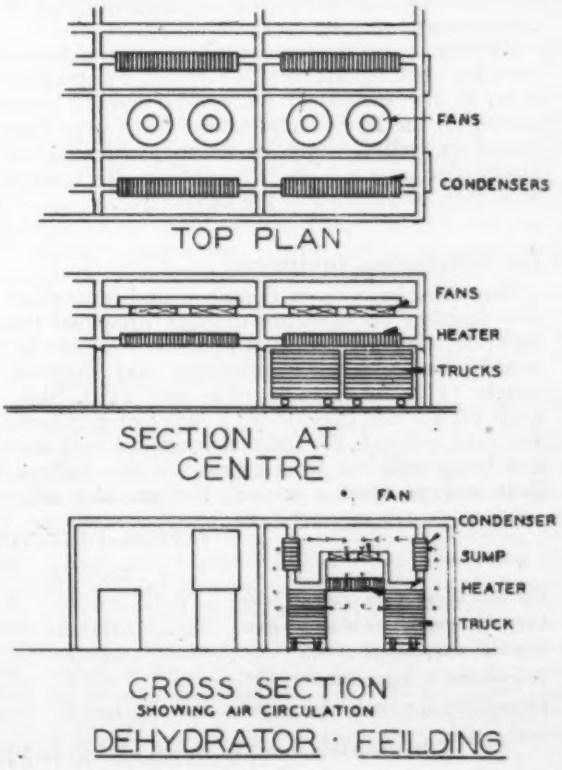
Handling of the Raw Meat

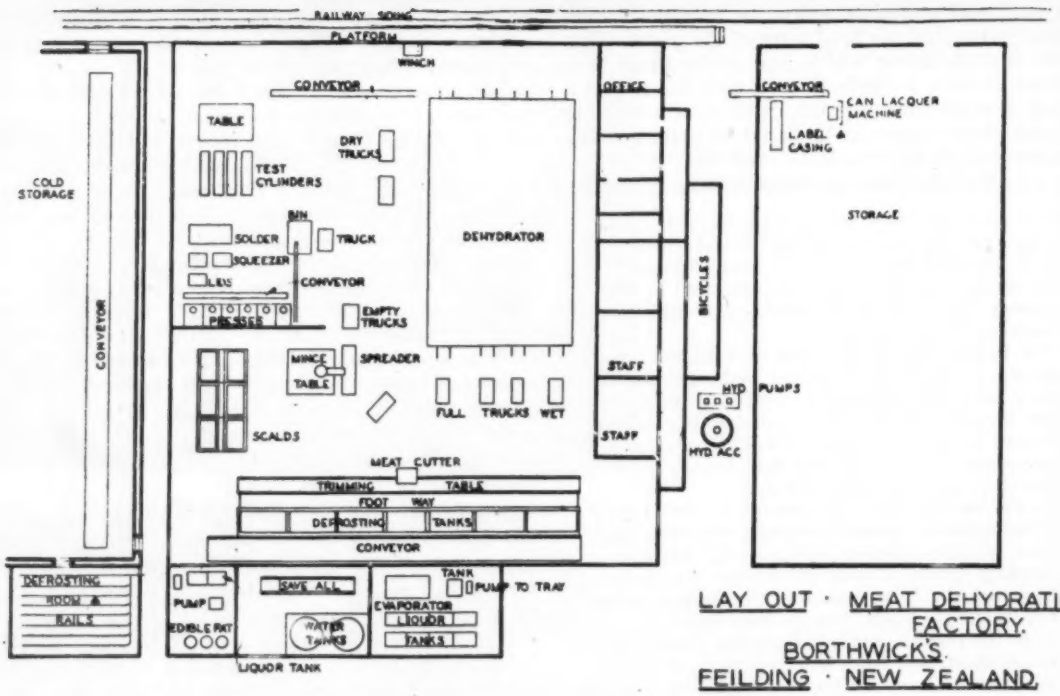
The factory was a ferro-concrete structure, well lighted, and of clean, simple lines, and was situated at the slaughter-house of Thos. Borthwick and Sons, Ltd., at Feilding. Meat from animals slaughtered at these premises was processed fresh, while that received from all the other slaughter-houses in the Dominion was in a frozen condition; this latter meat first had to be thawed out before processing. This was carried out by hanging the frozen material in a specially designed thawing room, where warm air was driven by means of a series of ducts into the room above the meat and gradually forced down over the frozen material and allowed to escape from the room at floor level. As an additional safeguard to ensure a supply of properly thawed meat for factory operations, vats were provided into which frozen or partially thawed meat could be placed. Water at a temperature of approximately 70° F. was then slowly circulated through the meat until thoroughly thawed out. The thawed or fresh meat was then delivered to a trimming table where trimmers removed gristle, surplus fat, etc. On this trimming table the pieces were reduced to a size weighing about 5 lb. From the trimming table the meat was delivered to a slicing machine where it was sliced by rotating circular knives into slabs not more than 2 inches thick. These slabs were delivered into perforated metal baskets.

The baskets, containing from 400 to 600 lb. of raw meat, were then conveyed to wooden cooking vats which were heated by means of closed steam coils. After the initial cook, which had to be carried out in boiling water, the baskets were plunged into the soup obtained from previous cooks—the usual time required to bring about a satisfactory result being approximately 20 minutes, at the end of which time the baskets were lifted, allowed to drain, and then emptied on to a large stainless steel receiving table, where further drainage and cooling occurred. Surplus soup from the cooking operation was overflowed into settling tanks, passed through filters, and reduced to 15° Bé. in a two-stage vacuum evaporator.

Treatment of Cooked Meat

The cooked meat on the receiving table was then fed into a power mincer equipped with a $\frac{3}{8}$-inch holed plate. The meat emerging from the mincer was spread evenly on the trays by dropping it on to a horizontal revolving wheel with four spokes, the meat being thrown out by the spokes to all parts of the tray. The under-side of each spoke was toothed and made contact with the meat on the tray and served during rotation to effect an





LAY OUT · MEAT DEHYDRATION FACTORY.
BORTHWICK'S.
FEILDING · NEW ZEALAND.

even spread. The tray loading was arranged so that the weight of spread was approximately 1¾ to 2 lb. per square foot.

At this stage the concentrated soup obtained from the cooking liquors was returned by spraying it on to the surface of the cooked minced meat spread on the trays. The loaded trays were then placed in trolleys, each of which accommodated ninety-nine trays 3 ft. by 2 ft. The loaded trolleys were then despatched to the dehydrator.

The Dehydrating Equipment

The dehydrator is a double tunnel-type plant and operates on the cross-draught principle; the structure, composed of ferro-pumice concrete internally and externally plastered, was approximately 55 ft. long, 33 ft. wide, and 13 ft. high. Each tunnel was divided by a series of partitions into four sections, the internal length of each section being sufficient to accommodate two trolleys. Four trolleys filled a section, two on each side. The ends of the trolleys were solid and lined up with the gaps in the partition walls to isolate each section so that different operating conditions could be applied. Air was driven by a fan over a set of heater coils into a plenum between the two lines of trolleys and built up in operation with a full charge in the section a static pressure of from 1 to 1½ inches water gauge. The air was forced in opposite directions across the trays along the 3 ft. length into two return ducts and, in the course of its return to the fan, passed through two condensers in which cold water was allowed to circulate.

The equipment required in each section consisted of two fans each delivering 20,000 cubic feet of air per minute, two condenser units, and one heater unit. The heater and condenser units were finned-coiled construction; the system was totally enclosed and the fan shafts passed through the top of the structure, air leakage being avoided by means of oil seals.

The trolleys used were approximately 6 ft. long by 3 ft. wide by 5 ft. high, and were fabricated of

TYPICAL OPERATING CONDITIONS.

	Section I.	*Section II.*	*Section III.*	*Section IV.*
Dry bulb temperature of air off heater ...	200° F.	180° F.	160° F.	140° F.
Dry bulb temperature of air off meat ...	171° F.	162½° F.	155½° F.	139° F.
Wet bulb temperature	146° F.	127½° F.	113° F.	97½ F.
Temperature of water entering condenser ...	60° F.	60° F.	60° F.	60° F.
Temperature of water leaving condenser ...	130° F.	120° F.	100° F.	90° F.

Total steam requirement for system, 3,236 lb. per hour. Time required in each section, 2 hours.

galvanised iron. They ran on two fixed leading wheels and a single swivelled wheel at the rear, thus avoiding the necessity of providing turntables. Each trolley was divided into three equal 2-ft. partitions, each of which was provided with guides for thirty-three trays. The trolleys were provided at the base with a type of drop coupling for attachment to each other.

Operation of the Process

In operation the trucks were fed into the first section, two trucks on each track, and the entry door was closed. When the necessary time had elapsed in the first section the entry doors were again opened and two more trucks attached on each side, the lines being winched forward until the first two trucks occupy the second section. This operation was repeated until finally the two original trucks were withdrawn from the exit end of the dehydrator.

Control of the temperature and humidity conditions existing in each section of the dehydrator was achieved by automatic valve control of the quantity of water and steam passing through the condensers and heater respectively, using wet and dry bulb recording controllers.

The actual conditions which are set for the dehydration of a quantity of meat depend largely upon the quantity of fat present, and some experience is required to set the conditions so that the product leaving the dehydrator has the correct moisture content (approximately 5 per cent.). The dehydrated product is discharged from the trays and lifted into overhead hoppers, the fat content of the product is adjusted to approximately 40 per cent., using a good grade edible beef tallow, and is then fed into presses and compressed into 6-lb. meat cans. These are then closed, tested under pressure for airtightness, dip-lacquered, labelled, and cased for despatch.

Bitter Almonds

OWING to the war, sweet almond orchards in the Mediterranean area have become very neglected, and many of the trees have reverted to the semi-wild bitter type. This, in addition to the rather haphazard labour conditions prevailing at present, has resulted in consignments of shelled sweet almonds arriving in this country being found to contain appreciable quantities of bitters.

As, apart from the bad effect upon the flavour of products made with almonds containing bitters, there is the question of their toxicity to be borne in mind—ten bitter almonds being sufficient to kill a child, and eighty an adult—a rapid and practical way of roughly determining the percentage of bitter almonds present in samples of sweet almonds has been devised.

The principle of the test concerns the reaction between hydrocyanic acid liberated by hydrolysis of the bitter nuts and the salts of picric acid, coloured compounds being produced. Once the test has been "calibrated" it can be operated by a chemically unskilled person.

About one pound of nuts are withdrawn from each sack by means of a sampling stick, and then ground to a meal between rollers or in a pestle and mortar. 20 grams of this is taken for the test. It is necessary to take a large sample, as few as one or two bitters in a hundred being objectionable.

For the preparation of test papers 0·625 g. picric acid and 1·25 g. anhydrous potassium carbonate are dissolved in water and made up to 250 ml.

Whatman No. 1 filter papers are soaked in this solution for a few seconds and then hung up to dry in a warm atmosphere, after which they are cut into strips about 1½ in. by ½ in., which are put into an amber glass bottle. Contact with anything else, especially metal, during handling must be avoided.

20 grams of each of the ground samples, weighed on a rough balance, are placed in 175 ml. wide-necked reagent bottles and 75 ml. water at 100° F. added and mixed with the nuts. A piece of the test paper is pinned to a cork wedge in the hollow on the underside of the stopper, or stuck to it with cellulose tape, the stopper being immediately replaced and the bottle left to stand in a warm place, between 120° and 130° F., for exactly ten minutes. It is essential that the test paper does not come into contact with the liquid in the bottle.

At the end of the ten minutes the test papers are removed, and the colour of each strip, which will range from the light yellow of the original paper to a deep brick-red, is compared with that of standard strips, so that a direct estimate can be made of the percentage of bitter almonds in the original samples.

Standard strips need only be prepared once, as the colour developed is quite permanent, especially if the strips are kept in the dark. In order to prepare these strips a sample of almonds should be sorted into sweet and bitter by tasting a portion of each nut—or else two samples obtained known to be wholly sweet and wholly bitter—the two types being then ground and recombined in proportions to give 1, 2, 5, and 10 per cent. bitters, and these mixtures, together with one ground sample containing no bitters, are then tested exactly as above. The resulting test papers are marked with the percentage of bitter nuts that they represent and reserved for comparison with the strips obtained from testing samples.

This test will indicate as little as 0·5 per cent. bitter almonds; and for most purposes a limit of 1 to 2 per cent. is suggested, sacks containing more than this amount being debittered in the usual way. If, however, a more sensitive test is required, a similar procedure may be used, using filter paper that has either (*a*) been soaked in a solution of Congo red and then, after drying, in a solution of silver nitrate, or (*b*) in a solution of gum guaiacum and dried, and then in a solution of copper sulphate. Great care, however, has to be taken if either of these tests is used, as they are so sensitive that the paper while drying may react with traces of impurities in the air. The gum guaiacum-copper sulphate paper will give a distinct reaction with as little as 0·05 per cent. bitter almonds, representing a concentration of HCN of about one part in a million. —H. F. BOWMAN.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, September 1, 1945, page 326.

No.	Date. 1945.	
		PRICE FIXATION ORDERS
123	Jan. 31.	Order amending the Animal Oils and Fats (Control and Maximum Prices) Order, 1943.
196	Feb. 17.	Order amending the Canned Fruit and Vegetables Order, 1944, the Preserves Order, 1944, the Meat Products, Canned Soup and Canned Meat (Control and Maximum Prices) Order, 1944, the Canned Fish (Maximum Prices) Order, 1943, the Condensed Milk (Control and Maximum Prices) Order, 1943, and the Milk Powder (Maximum Prices) Order, 1941.
216	,, 22.	Order amending the Meat Products, Canned Soup and Canned Meat (Control and Maximum Prices) Order, 1944.
230	,, 27.	Order amending the Cereal Fillers (Control and Maximum Prices) Order, 1944.
268	Mar. 8.	Order amending the Flour Confectionery (Control and Maximum Prices) Order, 1944.
272	,, 12.	Order amending the Eggs (Control and Prices) (Great Britain) Order, 1944.
296	,, 19.	Order amending the Bread (Control and Maximum Prices) (No. 2) Order, 1943.
302	,, 20.	Order amending the Eggs (Control and Prices) (Great Britain) Order, 1944.
331	,, 23.	Order amending the Coffee (Retail Prices) Order, 1943.
		FEEDING STUFFS
307	Mar. 22.	Order amending Feeding Stuffs (Regulation of Manufacture) Order, 1944.
		FISH
297	Mar. 19.	General Licence under the Fish (Supplies to Catering Establishments) Order, 1943. Revokes S.R. & O. 1944 No. 1156.
		FLOUR
250	Mar. 6.	Order amending the Manufactured and Pre-Packed Foods (Control) Order, 1942, and prescribing an Appointed Day. Revokes S.R. & O. 1942 Nos. 438, 1670 and 1917.
		FRUIT
284	Mar. 13.	Order amending the Canned Fruit and Vegetables Order, 1944.
		MILK
273/S5	Mar 12.	Milk Marketing (County of Banff) Order.
278/E. & S.	Mar. 13.	Directions supplementary to the Milk (Control of Supplies) Order, 1942, and the Milk (Control of Supplies) (Scotland) Order, 1942. Revokes S.R. & O. 1944 No. 1210.
304	Mar. 22.	Use of Milk (Restriction) Order. Revokes S.R. & O. 1941 Nos. 431 and 657.
350/S6	,, 27.	Milk Marketing (County of Banff) (Charges) Order.
		POINTS RATIONING
227	Feb. 26.	Order amending the Food (Points Rationing) Order, 1944.
		POTATOES
157	Feb. 9.	Order amending the Potatoes (1944 Crop) (No. 2) Order, 1944. Revokes S.R. & O. 1944 Nos. 1408 and 1450, and 1945 No. 49.
263	Mar. 8.	Order amending the Potatoes (1944 Crop) (No. 2) Order, 1944.
294	,, 16.	General Licence under the Potatoes (General Provisions) Order, 1944.
		RATIONING
333	Mar. 23.	Order amending the Fats, Cheese and Tea (Rationing) Order, 1944, and the Sugar and Preserves (Rationing) (No. 3) Order, 1944.
		RESTAURANTS
101	Jan. 26.	Order amending the Meals in Establishments Order, 1942.
		RETAILERS
131	Feb. 3.	Licensing of Retailers Order. Revokes S.R. & O. 1943 Nos. 291, 345, 566, 706 and 1770; 1944 Nos. 566 and 164 (as regards Local Distribution only).
		SOFT DRINKS
244	Mar. 3.	Order amending the Soft Drinks Order, 1943.
		TRANSPORT
305	Mar. 22.	Ice Cream (Transport) Order.
		VEGETABLES
132	Feb. 3.	Order amending the Drying of Vegetables (Licensing and Control) Order, 1941.

Electrical Food Distribution

C. RIDLEY, M.S.A.E.

THE careful handling and the hygienic conditions that exist in the preparation of foodstuffs logically call for the continuance of those conditions until the commodity is handed over to the consumer.

Gap between Manufacture and Consumption

In all commodities there is a gap between manufacture and consumption which is bridged by transport of some kind. That period calls for careful handling and punctual delivery. In the case of fresh or prepared foodstuffs, not preserved in airtight containers, the conditions may be said to be the somewhat more strenuous ones of careful handling, speedy delivery, and hygienic transport containers.

The body of the vehicle of transport is the container, and it is not airtight. Nine-tenths or more of the vehicles delivering foodstuffs are petrol driven, and they are therefore subject to the influx of fumes of petrol, lubricating oil, exhaust gases, and water vapour from possibly overheated engine cooling water.

It is in regard to the unhygienic conditions created by some or all of these fumes that the electrically driven van has the advantage over the petrol-driven vehicle.

Apart from the hygienic advantages offered by electrically operated delivery vehicles there are others. As compared with the internal combustion engine, the silence of operation of the electric motor is obviously desirable. Particularly is this so in the case of milk deliveries, which, efficiently to serve the community, should be made in the early morning before a large proportion of the population has yet risen from bed. For this service the petrol motor, with its noisy gears and banging clutch, is just as out of place as is the horse-drawn van, prematurely disturbing those who are still resting.

Duration of Service

The life of the electric vehicle is considerably longer than that of the petrol-driven one, hence depreciation is lower. The life of petrol food delivery vans has been placed at three to five years, and that of battery electrics between seven and ten years. Inasmuch as there are such vehicles on the roads which have been in service for considerably over twenty years, such periods of depreciation as referred to above seem fairly conservative.

Fuel and Maintenance Costs

The cost of fuel is an interesting comparison: between 7d. and 8d. per day provides a journey capacity of 30 to 40 miles, taken for stable comparison at pre-war rates of ½d. per unit, which sum would provide about half a gallon of petrol, and it would need from three to four of such half-gallons for an equal journey on a petrol vehicle.

Maintenance of the purely rotary motor vehicle —the electric—is obviously less than that of the high-speed reciprocating petrol engine with its high-temperature combustion system, and its sets of four pistons with rings, connecting-rods, valves, springs, and tappets; also its gearbox full of gears that must be shifted at every change, at which time the clutch must be taken out and let in again. There is also the starter, the dynamo, distributor, and plugs of the ignition system, the radiator with its water, the petrol tank and its petrol, and the exhaust silencer. All these things, in addition to the equipment of an electric, obviously call for attendance and its cost.

The even torque of the electric motor has a beneficial effect on tyre wear, which is consequently a lower item of maintenance cost, and the cost of insurance is usually some 25 per cent. lower than that of the petrol van.

In the case of large fleets a further condition

A fleet of electric works trucks. *Courtesy of The Brush Electrical Co., Ltd.*

". . . the delivery van spends a large proportion of its time standing idle by the roadside while the driver is handing in the deliveries to the individual houses."

arises: that of floor space covered by the electric, which, being less in wheel-base, permits of smaller garage space for housing the fleet. This fact is hardly noticeable in an individual vehicle, but when multiplied by fleet numbers it demands and receives attention.

Unusable Advantages of Petrol

Petrol has two main advantages over the battery electric: they concern speed and distance covered. Petrol facilitates travel at between 40 and 50 miles an hour, whereas an electric vehicle is fast if it attains 20 miles an hour. As to distance on one supply of fuel, petrol gives 200 to 250 miles in hand, whereas battery electrics can run 40 to 50 miles on one battery charge. However, there are very few rounds of delivery which exceed 30 miles daily. That is well within the possibility of a single battery charge, and since the idle hours of the night are made use of to charge the battery, which requires from 8 to 10 hours, there is no waste of time, nor is there any disadvantage in the short distance or radius of action as compared with the petrol van.

With reference to the speed, a factor which is not at first obvious is that the delivery van spends a large proportion of its time standing idle by the

". . . the fact that dairy companies are using electrics running into hundreds suggests that they are acting on the experience that they have gained in spite of their higher purchase price."

Courtesy of The Brush Electrical Co., Ltd.

COMPARATIVE OPERATING COSTS—1-TON PETROL AND ELECTRIC VANS.

Item.	*Electric.*			*Petrol.*		
	Year.	*Week.*	*Day.*	*Year.*	*Week.*	*Day.*
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1. Interest	9 10 0	3 10	6	6 0 0	2 5	4
2. Depreciation	23 15 0	9 6	1 4	67 5 0	1 6 11	3 10
3. Battery rental	40 10 0	16 2	2 4			
4. Road tax	15 0 0	6 0	10	20 0 0	8 0	1 2
5. Insurance	7 10 0	3 0	5	15 0 0	6 0	10
6. Tyre renewals	20 10 0	8 2	1 2	20 10 0	8 2	1 2
7. Body maintenance ...	5 10 0	2 2	4	2 10 0	1 0	2
8. Chassis maintenance ...	15 0 0	6 0	10	38 10 0	15 5	2 3
9. Distilled water and lubricants	2 10 0	1 0	2	4 15 0	1 11	3
10. Fuel	18 5 0	7 4	1 1	57 10 0	1 3 0	3 3
Totals	158 0 0	3 3 2	9 0	232 0 0	4 12 10	13 3

BASIS OF COMPARISON.

	Electric.	*Petrol.*
Capital cost	£315	£230
Interest	3 per cent.	3 per cent.
Depreciation	8½ per cent.	33⅓ per cent.
Fuel	0·5d. per unit.	1s. 7d. per gallon
Payload	1 ton.	1 ton.
Miles per day	30	30
Working days per year ...	350	350

NOTES:

1. Capital cost of electric includes charger but not battery.
2. Interest equivalent to 5 per cent. on undepreciated balance of capital expenditure.
3. Depreciation is on capital cost less tyres.

From "Electric Vehicles."

roadside while the driver is handing in the deliveries to the individual houses. That time is common to both systems and as a comparison cancels out. The remainder of the time spent in running is therefore the matter for comparison, and when it is considered that the vehicle is stopped and started every 200 yards or so it will be clear that the complicated business of starting the petrol vehicle puts it at a disadvantage with the electric, whose driver has only to press the accelerator pedal and is away. The result is that the tortoise electric does the complete journey of multiple stretches in the same time that it takes the hare—the fast petrol vehicle—to do the same distance. These conditions are confirmed by operators who have used both types of vehicle, and the fact that dairy companies are using electrics running into hundreds suggests that they are acting on the experience they have gained, in spite of their higher purchase price. It is generally admitted that the running costs of the battery vehicle are lower than those of the petrol-driven van. A factor in this connexion is that although the electric van is more expensive than the competing petrol the average length of life is double as long, so that the depreciation item in the cost is not adversely affected in the case of the battery vehicle.

Some General Statistics

To compare by generalisation is often misleading; it misses the advantages of the minority, which can, under a matching minority utilisation, perform duties much more efficiently than can the majority vehicle, which is built for general use and therefore cannot be as efficient as one in which specialised natural advantages are put to suitable uses.

To take the whole of goods transport in this country: there are approximately 500,000 in operation. These figures are quoted for 1938, the last stable period for which statistics exist. In that year there were some 70,000 goods vehicles manufactured. In the same period there were fewer than 5,000 electrics at work and under 1,000 manufactured. An intelligent analysis brings out the fact that there are, among these 500,000 goods vehicles, nearly 150,000 which are under a ton payload. It is recognised that most of these vehicles are on local work and come within the general category of short-distance daily duty; that they are, in fact, mostly on the daily house-to-house food deliveries. If only two out of three are so employed the total would be 100,000 vehicles.

When it becomes recognised that instead of 1,000 vans per annum, one-fifth of the annual production of 70,000—namely, 14,000—is the number which can efficiently be put into use annually, the limiting factor of the present development of the system—that of cost—can take on quite another aspect.

The 1938 production of vehicles up to a ton payload, amounting to nearly 25,000 petrol vehicles, was divided between four makers; this

would average over 6,000 vehicles each. The electrical vehicle makers numbered about fifteen, which would mean that an average of sixty-six vehicles was the allotment per firm. It is, of course, a fact that some firms did much more than others, but the total figures of the industry are representative of the financial condition that would attach to the selling prices of the vehicles.

There are indications that attention is being given by the big petrol vehicle makers to the possibilities of the special conditions appertaining to short-distance transport, and to the peculiar adaptability and advantages of battery traction to meet those conditions. Enquiries received by those manufacturers from operators of short-distance transport indicate also that those operators envisage the possibility of a design which can just as easily be equipped on the final assembly line with electric or petrol alternatives according to the demand, and they are obviously keenly alive to the difference of cost of electrics made under such conditions as compared with prices that have ruled in the past.

The Availability of Electrical Fuel

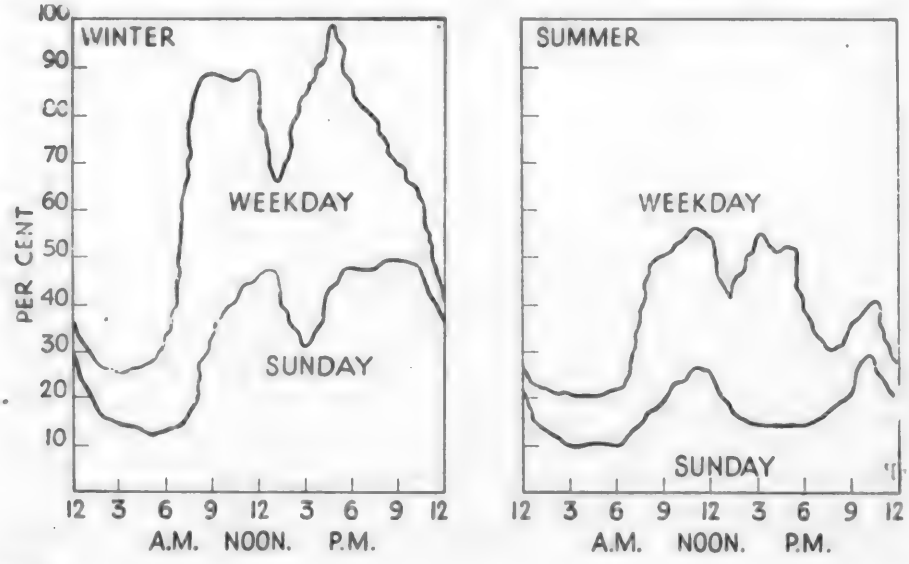
An electric vehicle battery is recharged during the night; in exceptional cases, and to meet special requirements, it has a midday charge or boost, which is a part charge. There are special terms of payment for night charging in most towns in the country, and some also offer special cheap prices for the midday boost. In the period under discussion above the cost of battery charging during the night or off-peak load period of the generating station was just over ½d. a unit, averaging ⅝d.

There is plenty of fuel available, and it comes from our own resources, not having to be imported from overseas. The sources are the grid and other stations generating electricity all over the country. In 1938 there were installed nine million kilowatts of generating plant, the average load on which was eight million kilowatts. That, however, did not represent the availability; since the charging is done at night, when the load is down to between 25 and 50 per cent. of the peak day load, the current available for recharging batteries during the hours of night is sufficient for many thousands of vehicles, at least ten times those on the roads at the present time. There is, therefore, no necessity to put in more plant for the accommodation of a possible battery charging load; the present plant will suffice for quite a considerable time.

In order to charge batteries from the grid alternating current mains, which are at a considerably higher voltage than that required for batteries, besides the fact that it is direct current, it is necessary to instal a charging plant which converts the alternating current to direct current at a suitable voltage.

When a vehicle is purchased a charging plant is included in the equipment. This charger is fixed in the garage to which the vehicle will return at night. It is only necessary to plug in to the charger a cable from the battery and the operation starts; it is automatically controlled as far as filling the battery ready for the morning, and prevention of damage from faulty conditions of charging.

In the past many batteries were ruined because of the inattention to adjustment of the current to meet the changing conditions of the battery which occur during charging. With the modern charging plants this cannot occur; the internal changes occurring in the battery are themselves made to operate controls which maintain efficient conditions of charging as well as protection from damage.



Typical load curves. Electricity grid system.

Some Battery Information

There are two types of batteries in use for traction purposes; by far the larger proportion of traction batteries are of the lead-acid type, the nickel-iron-alkali battery being more used for stationary work on account of its greater weight and bulk, owing to the fact that its cell voltage is much lower than that of the lead-acid battery.

The life of a lead-acid cell is guaranteed at three years; with the necessary care it lasts nearer five years. It is much heavier than the motor-car type of battery, being 1 lb. weight per 8 watt hours output, the motor-car type being 12 watt hours for the same weight.

The working conditions of the two types of batteries are very different; the traction battery is discharged and recharged daily, whereas the motor-car type is continually charging to, and retains its condition approximating to, 100 per cent. charged all the time. This can be accomplished in a car battery, as the power required for the purpose is but one-tenth of a horse-power out of a total horse-power of 25, which is negligible. Obviously a traction battery cannot be so treated; it would require 100 per cent. charging, which is an impossibility; yet so many people ask why the battery of an electric car cannot be charged by a dynamo while it is going along the road!

Quite a number of people are nervous of electric storage batteries; they have heard tales of destruction by careless charging, which was quite true in the old days before the introduction of the automatic charger, which controls the current that is put into the battery by means of the internal condition of the battery and its change in internal resistance as the state of charge advances. This is done by an automatic arrangement which requires no attention whatsoever; the lead from the battery is just plugged into the terminal on the charger and the charging starts, is controlled so that the electrolyte is not boiled away, and is switched off, also automatically, when the battery becomes fully charged.

Battery maintenance is appreciably small, little else than the addition of distilled water and the checking of the density of the electrolyte being necessary.

Some people hire their batteries instead of purchasing them with the vehicle, which materially affects the purchase expenditure. Such financing does not materially affect the difference in running cost comparison with petrol, but it does relieve a possible anxiety when the time to buy new and expensive batteries comes near. This fear has been the deterrent to the purchase of many an electric vehicle.

Future Developments

The near future will see considerable advance in the constructional technique of battery electric vehicles. Motors of one-third the present weight are a possibility. Aluminium and magnesium, by reason of their light weight and by the experiences of war-time uses, will be available and applied; the cost of these new materials will be such as to encourage their use, particularly in transport vehicles, on account of the reduced cost of operation of the lowered gross load; it will take the form of raising the payload capacity by the extent of the saving of the dead weight in the vehicle. Aluminium, for example, will fall from its pre-war level of £110 to £60 per ton.

The cost of batteries used for transport purposes is not yet down to an economic possibility on account of the small numbers and large variety of the manufacture; when these disadvantages are removed they will aproximate to the car battery cost, which is one-third that of traction batteries.

There is the possibility of the development of a primary battery, using magnesium and graphite plates; such a development would multiply the battery capacity many times or, alternatively, reduce the size. It would also eliminate the necessity for recharging such batteries.

A fast-charging system is in the laboratory stage of development by which it will be possible to put in 80 per cent. of a total charge in an hour without damage to the battery. Tests of battery life under such conditions are under way.

Is "New Canning System" Practicable?

(*Continued from page* 390)

sterilisation. A special pilot test processor fitted with electrical thermocouples and recording gear, including thermocouples in the cans themselves, was used for these tests and temperature curve graphs made during the trials for examination and checking against normal steam retort processing results.

An important point to be considered with this dry heat pressureless method, over the steam pressure continuous cooker method, is concerned with breakdown under load. When this occurs in a continuous steam pressure cooker much delay takes place in relieving pressure before an attempt can be made to remedy it, and distortion and cooling risks to the pack accepted, whereas with the dry heat method a quick shut-off of the heat source and the opening of one of the inspection-doors will locate the trouble in short time, remedy it, and start up again with a minimum loss of valuable time and material.

*

The statement by the U.S. packer that he had investigated the desirability of using continuous steam processors and had discarded the idea because of lack of flexibility is of interest, although British canners may hold different views.

"Mom's Cooking"

MR. GENNARO CAPALDI, an American food canner, hit upon the ingenious idea of putting up for American soldiers serving overseas actual samples of "Mom's Cooking."

Fig. 1.—The home-cooked meal starts its long journey from the kitchen to the battle front. The soldier's favourite beef stew is prepared and tasted for flavour prior to canning and processing at the plant of the Naples Food Products Company.

Origin of the Scheme

Mr. Capaldi, putting himself in the soldier's place, decided that what he would appreciate most during hard days of fighting would be a home-cooked meal "like mother used to make."

An ambitious scheme was prepared whereby the firm would can free of charge the favourite dish of any American serviceman overseas. The selected dish, after being prepared and cooked at home, was taken to the Capaldi plant where the food was canned and processed ready for shipment overseas.

Americans at home were quick to take advantage of this novel service, and many a soldier serving in the Far East has been the happy recipient of a home-cooked meal—a welcome change from his everyday diet.

Final Touches

Carrying the personal note to the "outside limits," an attractive victory label bearing a message from home was affixed to the can.

Fig. 2.—Mr. Gennaro Capaldi carefully examines the foods brought in, after which he determines the processing required for the various dishes.

Fig. 3.—Under the stern and critical eye of two mothers, two employees of the Naples Food Products Company proceed to pack the home dishes.

Fig. 4.—The home products undergo the usual routine of commercial canning. Here the cans are being double seamed.

Fig. 5.—The final stage. Here is the triumphant presentation of the special dishes—canned, processed, and labelled—to the mothers who originated them. With a special message on their victory labels, the mothers will pack and ship them to their boys overseas.

A Treatise on Tinplate

THE manufacture of tinplate is a long-established industry of major importance, utilising considerable quantities of steel and tin. Its applications are very wide, perhaps the most important being as a packaging material for almost all types of food. It is, therefore, rather surprising that a book devoted solely to this subject has not been produced earlier in this country. Considerable information on the production and properties of tinplate is available, but is widely scattered in diverse publications, with the inevitable result that users of tinplate in general, and even those engaged in one particular method of production, have only an incomplete understanding of the subject as a whole. The appearance of such a treatise* is doubly welcome in this country in view of the rapid transition that is now taking place in South Wales, where the industry is concentrated, from the older "hot-pack" rolling process to the strip, cold-reduction, process.

The authors have had the producers foremost in mind in considering the history, manufacture, properties, structure, testing, and corrosion resistance of tinplate, as they rightly regard its fabrication as a subject worthy of a separate book. The sections dealing with the structure of tincoating, the testing, and the corrosion resistance of tinplate, will, however, be of considerable interest to tinplate users.

The descriptions of processing details, and of plant designs and layouts, have been very clearly set out, but a few points occur to the reader, a more extended treatment of which would have been welcome. Instances which may be quoted are the classic work of Caswell on substance variation; the disposal of waste pickling liquor, which has received so much attention in the technical press of recent years; the use of immersion heating for pickling; and the variation of tincoating thickness, both over a sheet and from sheet to sheet in a batch. On this latter subject it is appreciated that the authors have had to rely on the rather scanty literature already published on the subject, and it is to be hoped that the publication of their book will encourage those who may possess more detailed information to publish the data in their possession.

The treatment of the metallurgical aspects of rolling and annealing is rather too condensed to be of much assistance to the reader without metallurgical knowledge, and while on this point it occurs to the reviewer that in future editions the photomicrograph of large-grain size in tinplate steel on p. 70 might, with advantage, be reproduced at the same magnification as that of the others with which it is to be compared. A notable omission in this chapter is that no details are given of the number of passes through the cold rolls in the pack-rolling process.

Tinning and the structure of tincoatings are authoritatively dealt with, as one might expect from these authors, one of whom in particular has made very valuable contributions to this aspect of the study of tinplate.

A disappointing piece of condensation is the treatment of the subject of "wasters." The few photographs given of types of wasters are excellent, but a much more comprehensive list both of photographs and in the text would have provided a compilation which many users have long wished for.

From the critical sections on the testing of tinplate, the authors pass on, in the same chapter, to a surprisingly uncritical treatment of the several methods of determining the porosity of tincoatings. These tests are of largely academic interest in their present state of development; all are of doubtful reliability and are rather tedious. Further work is necessary before they might be considered satisfactory as routine tests.

The subject of corrosion, a constant source of trouble to users of tinplate, is very well reviewed, and although the bibliography to this chapter is not complete it is wide enough to lead to a very thorough acquaintance with the subject. In passing, another notable omission from the bibliographies is the absence of Brooke's "Chronology of the Tinplate Works of Great Britain" from the list of historical references.

The book ends with a comprehensive Statistical Appendix covering all aspects of world production, exports, usage, and prices.

The book has been well produced; the quality of the paper, printing, and photographs is excellent, and the standard of proof-reading has been so high that only one unimportant typographical error has been noticed. In this connexion, however, attention may be drawn to Table 20 on p. 157, which, if it does not contain typographical errors, appears to require further explanation, since the figures recorded show no relation between hardness of tinning-roller material and tincoating weight.

This truly excellent book should prove very valuable to all who have to do with tinplate, and it will be unfortunate if the price proves to be beyond the reach of some students of the subject.

* *Tinplate.* By W. E. Hoare and E. S. Hedges. London. 1945. 40s. net.

Bacteriology of Dried Egg

THE bacterial flora of spray-dried egg powder is influenced profoundly when stored at high temperatures. The total number of organisms per gram of sample is reduced as the storage temperature is increased; conversely, when the temperature is lowered, higher counts are obtained and a more diversified bacterial flora can be detected.

Organisms of the genius *Bacillus* predominate in spray-dried egg powder when kept for three months, irrespective of the temperature of storage. For the isolation and determination of total counts of stored, dried egg power, yeast-water (one part) added to glucose-tryptone agar (nine parts), recommended in "Standard Methods for the Examination of Dairy Products," is a suitable medium.

The data support the findings of Gibbons and Fulton (1943) that higher counts are obtained when the plating media are incubated at 32° C. than at 37° C.

Storage of spray-dried whole-egg powder in tin cans, greaseproof cartons, or greaseproof cartons plus carton liners, does not appreciably affect the total bacterial counts or the bacterial flora. Compression of the egg powder may reduce the total count slightly, but appears to have little effect upon the survival of the different species of bacteria in the sample. *Food Research*, 1944, **9** (6), 505.

Air Conditioning in the Food Factory

Part II

FRANK H. SLADE, A.M.I.Mech E.

WITH the advent of modern air conditioning applied to process work, and the maintenance of greater temperature differences between external air and the air in conditioned spaces, the need for efficient insulation becomes apparent. Temperature differences set up a heat flow and therefore it is of great importance in the erection of insulation in conditioned spaces to employ a highly efficient heat-insulating material to reduce this to a minimum.

Importance of Insulation

The usual order for planning a conditioned space is first to consider the conditioning plant and then how it is to be insulated.

This order should be reversed, for insulation is not a secondary detail, insomuch as the efficiency of the insulation determines to a great degree the amount of work imposed upon the conditioning plant, the heaviest duty being that of catering for the heat leakage through walls, floor, and ceiling. The more this loss can be reduced by means of insulation, the less load upon plant, resulting in the installation of smaller capacity equipment and reduced operation duties. Insulation, therefore, has a direct bearing not only on the amount of the initial investment, but also on the day by day, year in year out, cost of operation.

Low conductivity is obviously the most important single factor to be considered in selecting insulation, although there are many others involved, and to be acceptable for air-conditioning duties in the food industry any insulating material, in addition to being an efficient non-conductor of heat, must also be:

1. Permanently non-absorbent of moisture, this being an excellent conductor of heat.
2. Free from objectionable odours, and free from liability to rot or mould or to harbour vermin.
3. Readily handled and erected by available labour and with ordinary tools.
4. Slow burning and a fire retardant.
5. Reasonable in cost of material, erection, and maintenance.

Air Motion, Distribution and Purity

Common to the two sets or combinations of factors involved in the normal air-conditioning installation are air motion, distribution, and purity.

Fans are used to produce air flow or motion and are classified according to the direction of the air flow; thus in "axial" flow fans the flow is parallel to the axis, and in "radial" flow or "centrifugal" fans the flow is parallel to the axis of rotation.

Considering these in their respective order, it will be found that the axial flow type fans are manufactured in two main forms: (1) the propeller or disc fan, and (2) the airscrew fan. The former of these fans consists of an impeller, the boss of which is usually mounted upon the spindle of an electric motor, the impeller rotating in a cast-iron ring, this ring acting as the main body for mounting the fan. The blades are usually from four to six in number, being constructed of sheet steel, either cambered or flat, set at an angle to the plane of rotation. The latter—the airscrew fan—is an application of the airscrew theory to design of fans; the cross section of the blade is an aerofoil section, the angle of twist and section of the blade varying over the entire length of the blade to ensure equal loading throughout.

The radial flow or centrifugal fan comprises many types, such as steel plate fans, pressure blowers, and the more commonly employed fan in air-conditioning work—the centrifugal fan. The latter is found in two types—the forward-curved blade and the backward-curved blade multiblade fan—the main characteristics of each being that the forward-curved blade is employed in a fan having slow-speed operating characteristics, while the backward-curved blade is used in fans having high-speed operating characteristics.

However, modifications in the curvature of the blade and its angularity of setting will produce varying conditions of operation, so it can be said that centrifugal fans may be manufactured with very slight modifications in design to suit any particular set of conditions.

The main difficulty in practice is to select the correct type of fan to suit the conditions in the first place, for although fans of all types can be utilised to perform the duties generally encountered, in practice their use may be limited for a variety of reasons, such as mechanical difficulties, noise, or lack of efficiency in the particular application.

The main applications for the propeller, airscrew, and centrifugal fans are: "Propeller type fans" where air has to be moved against low resistance and where absence of noise of operation is not vitally important. "Airscrew fans" are used wherever fans are needed for air circulation, the main advantages of this class of fan being its "straight-through" air flow, allowing for space saving and simple ducting, its definite non-overloading characteristics and high efficiency over a wide range of operating speeds. "Centrifugal fans" are indicated where higher resistances are encountered and the absence of noise is of major importance.

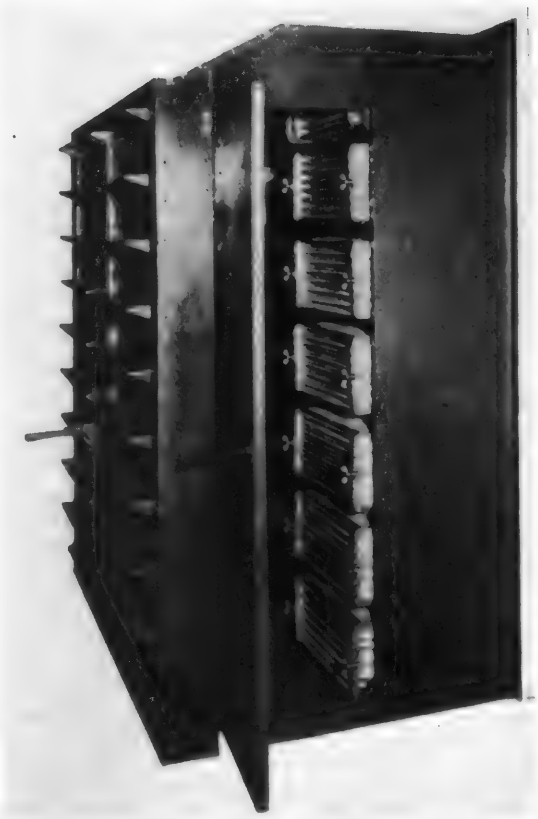


Fig. 1.—"Kompak" filter fitted to louvered inlet of air-duct system, constructed of easily manipulated cells to facilitate servicing.

Courtesy of Vokes, Ltd.

Distributing Systems

While fans provide the motive force for circulating the conditioned air, it is necessary to provide a distributing system, which can be regarded as the arteries carrying the stream of air from the heart of the system—the conditioning plant.

In the design of ducting for air-distributing systems there are four factors to be considered:

1. The volume of the conditioned air being supplied to each point.
2. The allowable duct velocities.
3. The frictional resistance of the ducting.
4. The pressure required at the fan to overcome the frictional resistance of the ducting, and to produce the correct velocity pressure at each point of delivery in order that the required quantity of conditioned air may be obtained.

It is often necessary to insulate the ducting to reduce heat leakage as much as possible, and also to insulate the ducting to minimise noises. Air noises are dependent upon the velocity of the air through the ducting; usually these velocities can be kept well below the velocity at which air noises are audible; in such cases where space is limited velocities have to be increased and sound insulation is resorted to where quietness of operation is essential.

It is also essential, for efficiency and economy of operation, that all ducting should be kept as straight as possible, avoiding all sharp bends and elbows wherever possible, reducing in consequence both operational and installation costs.

The resistance of a single 90 degree elbow is equivalent to the frictional loss in a straight length of ducting six times the diameter of the duct in length, which means that for a single 90 degree bend in a small circular duct of 12 in. diameter the frictional loss would equal that of a straight duct 6 feet in length. Many bends such as this, especially with ducting of large proportions, would necessitate a larger fan, a higher horse-power motor to drive it, and increased operating costs as well as the higher cost naturally accompanying an installation where a large number of bends are unavoidable through the nature of the structure.

However, where bends are unavoidable, especially in large ducts, the fan duty will be considerably reduced if vanes are fitted. For instance, in one case where vanes were employed in a square elbow the pressure loss was reduced to 0·07 per cent. of its original value.

Mathematically, it is possible to calculate the size of the ducting to secure an equal pressure loss in the whole system, so that each branch will balance up with its fellows. Unfortunately, this ideal condition cannot be realised in practice, the practical sizes and the many small inequalities in construction defeating this object.

In order to overcome these difficulties it is necessary for dampers to be fitted to each branch duct, also supply and extraction grilles. By this means the resistance to the flow of air to each supply or extraction point can be equalised and the correct quantity of air to be admitted to or exhausted from the conditioned space ensured.

Before leaving this all-important subject of air distribution, the remark may aptly be made that if a building is to be air conditioned it is advisable that the architect and engineer collaborate in the early days of design, so avoiding the many snags that might otherwise be encountered when fitting the necessary ducting.

Air Purity

The cleanliness of the air is one of the most important factors of air conditioning, for the presence of dust, often germ-laden and contaminated by bacteria, has long been one of the industry's most troublesome problems. This is especially true in the food industry, where the presence or air-borne solids has a very deleterious effect on many processes.

The elimination of these air-borne solids or dusts

from air brought into a building, or from air recirculated in the building for air-conditioning purposes, is the function of an air-cleaning or filtering device, and the fundamental reasons for its application to atmospheric and process dust removal problems are:

1. To improve the quality of a product.
2. To protect machinery and equipment.
3. To safeguard health and promote personnel efficiency.

It should, however, be stressed that before proceeding with the purchase of air-cleaning equipment it is advisable to seek the guidance of reputable filtration engineers, for if a filter is to operate efficiently an expert knowledge of the dust it is expected to handle is necessary; it is the lack of knowledge of these air-borne solids that is responsible for the installation of so many inefficient air-cleaning devices. This can be more fully appreciated when the following requirements of an efficient air filter are considered:

1. High efficiency and dust-arresting power.
2. Low resistance to the flow of air through the filter.
3. High dust-holding, or long life in service.
4. Economy in first cost and upkeep.

In addition to these there are other requirements such as freedom from odours, ease of cleaning or replacement, uniform efficiency over a wide range of temperatures, low moisture-absorption, etc.

There are many ways of cleaning dust out of the air, but a design which has come to the forefront in recent years on account of its high arresting powers with low resistance to the flow of air passing through it is the dry fabric type filter, the filtering action of which is that of a positive strainer, stopping even the most microscopic dust particles.

Dry fabric type filters are manufactured in two main types:

1. Filters which employ a durable filtering material, cleaning being carried out periodically by means of a vacuum cleaner or by an automatic rapping device fitted to the filter.
2. Filters which employ a low-cost filtering material which is replaced when thoroughly dirty.

The "Kompak" filter shown in Figs. 1 and 2 illustrates the large ratio of filtering area to frontal area obtained with these filters—namely, 13·5 to 1. The smaller picture in Fig. 2 also indicates the ease whereby the filtering medium can be renewed.

There may, however, be instances where electrical machinery is used in spaces not supplied with conditioned air, being in consequence exposed to dust hazards. Electric motors usually have what is called an "open air circuit" method of ventilation, or the cooling of the motor is effected by air being forced through the machine from the surrounding atmosphere. Unless clean air is supplied, dust from the ventilating air will be deposited on the windings, causing overheating by its heat-insulating effect. This will eventually lower the dielectric value of the electrical insulation, causing

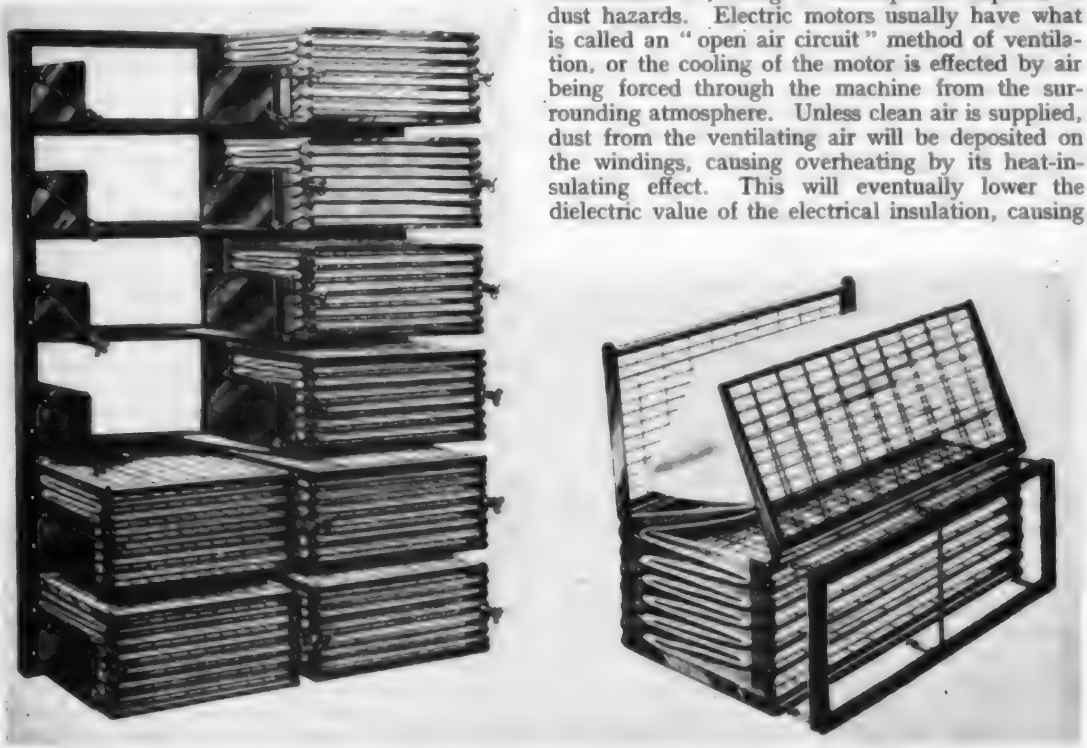


Fig. 2.—12-cell "Kompak" filter, showing how cells are removed and serviced when filled with dirt.
Courtesy of Vokes, Ltd.

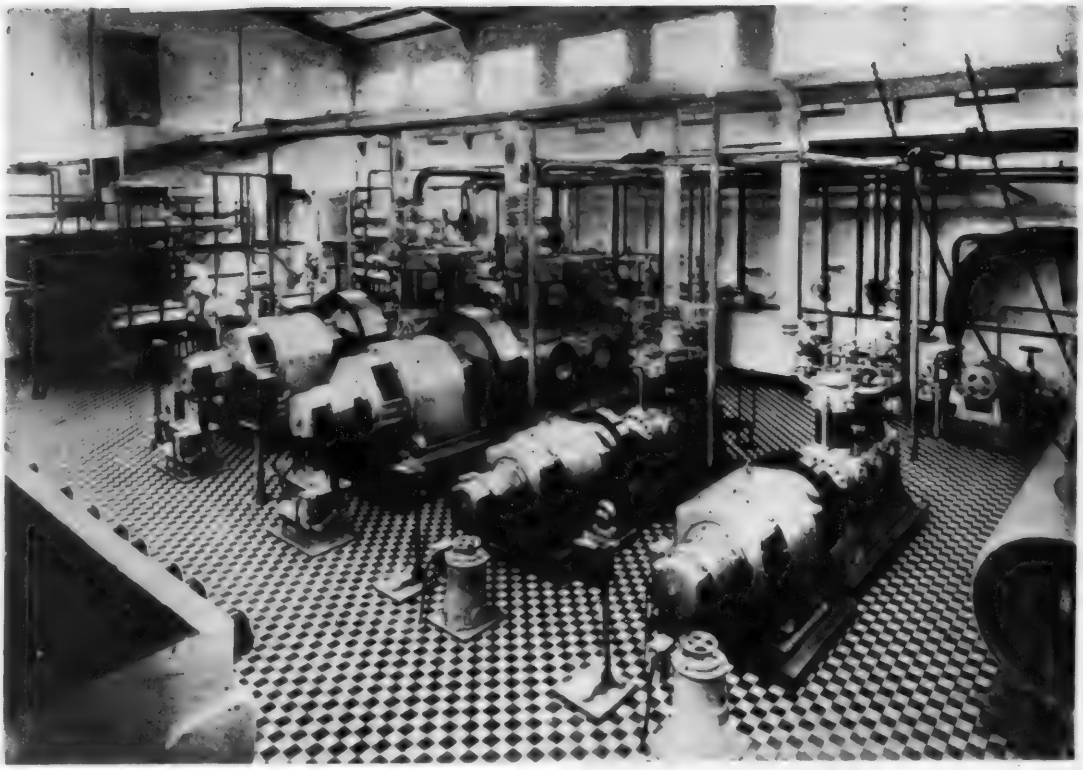


Fig. 3.—310 B.H.P. auto-synchronous motors operating a 273 r.p.m. on 380 volts, 3 phase, 50 cycles, driving refrigerating compressors for a pre-cooling plant in South Africa.

Courtesy of Crompton Parkinson, Ltd.

local "shorts" and even complete "burn-out" of the windings, thus shortening the operating life of the motor.

Another harmful effect of those air-borne solids is that the dust particles impinging on the windings will wear away the protective varnish and insulation; a machine in such a condition on cooling in a normal atmosphere will be liable to rapid moisture absorption in the windings, leading eventually to a serious and unexpected "burn-out."

To avoid these premature failures it is necessary to extract the impurities from the incoming air, or air filters should be fitted to all electrical machinery if maximum operational life is to be secured.

Electric Drive

Generally speaking, the selection of air-conditioning plant is governed, in addition to considerations of economy of first cost and operating cost, by the most convenient and dependable source of energy; consequently the electric motor, available in many different types suitable for various services, is now the most widely used of prime movers.

Electricity is almost invariably required on the site of the installation to operate circulating fans, pumps, and other auxiliaries, and this availability of, or the need for, electric power to operate these auxiliaries no doubt influences the use of electricity for the refrigerating compressor used for cooling and dehumidification.

There is a predominance of alternating current supplies in the electrical energy available, but there are still many direct current distributing systems in existence, for which direct-current motors must be used.

Types of Motors

The types of direct-current motors available are the shunt wound, compound wound, and series wound; the last, however, has only limited application in a few special cases. "Shunt wound" motors have the field and armature circuits connected in parallel and are suitable for application to fans, centrifugal pumps, or similar equipment where the starting torque is relatively small. The effect of the wiring arrangement of this motor is that the field magnets produce a magnetic flux in the poles of constant strength irrespective of constant speed. With current applied to the armature a practically constant armature speed results.

"Compound wound" motors are used for heavy-duty plant drive on account of their superior starting torque over the shunt-wound machine; therefore these motors are required for driving refrigerating compressors, stokers, reciprocating pumps, etc., when started under loaded conditions, and also for similar equipment when high starting torque is desirable. Compound-wound machines have characteristics which are a compromise between series- and shunt-wound motor.

A desirable feature of motors used for air-conditioning plant drive is that of constant speed. This need is met by the employment of shunt-wound and compound motors, insomuch as for well-constructed shunt-wound motors of reputable make the speed variation will not be more than plus or minus 5 per cent. for motors over 3 h.p. in output.

If for any special reason wide speed control is required, it may be secured by using motors with adjustable speed and adjustable varying speed characteristics. Adjustable-speed motors are usually shunt-wound, since it is impracticable to maintain the proper relation between the shunt and series fields of compound-wound motors when wide variations of the field strength are required to obtain the speed adjustment, while adjustable varying-speed motors may be either shunt or compound wound, and speed adjustment is secured by adding resistance in series with the armature.

On account of the peculiarities of alternating current supplies is that when flowing in coils the current does not reach its highest value until after the voltage. This lag in the current is called the "power factor," and results in more current being required by the motor for the same duty than for the equivalent direct-current machine.

The power-factor, also the efficiency of an alternating-current motor, depends upon the design and operating characteristics of the machine, and information upon these points can be secured from manufacturers.

When the electrical supply is polyphase current two types of motors are normally used:

1. Slip-ring motors.
2. Squirrel-cage induction motors.

The first of these is built for two classes of service, constant speed and adjustable-variable speed, speed control being obtained by an external resistance in a manner similar to that applied to a direct-current motor, except that here the controller is connected to the motor via slip-rings and brushes on the shaft and not to the stationary magnets.

The squirrel-cage induction motor may be selected for operating any air-conditioning and allied equipment, and is available in three types and a full range of sizes: these are the "Normal Torque" low-starting current, the "Normal Torque" normal-starting current, and the "High Torque" low-current squirrel-cage motors. As these three types of motors are also available in two-, three-, or four-speed designs with variable-torque or constant-torque characteristics it can be seen that a selection may be made to obtain the correct motor to drive air-conditioning equipment for any specific purpose.

Should, however, there be a need for a "power-factor" correction, then it is usual to use a synchronous motor, either high or low speed with constant-speed characteristics.

A very interesting application of auto-synchronous motor drive is illustrated in Fig. 3, showing this type of motor direct-coupled to 180-ton capacity twin-cylinder refrigerating compressors in the engine-room of a pre-cooling plant in South Africa.

Automatic Control

In conclusion mention should be made of the importance of automatic control. The efficiency of an air-conditioning plant is very largely dependent upon the limits within which temperature and humidity can be controlled. With a correctly designed control system, interlocking and coordination of the functions of a plant is accomplished in a manner that is not possible with manual control, or it can be said that the accurate performance of an air-conditioning plant is dependent upon its automatic-control equipment.

This subject was dealt with in detail in an article published in FOOD MANUFACTURE, November, 1942.

The Chemical Senses

BOOKS on the chemical aspects of sensation are extremely rare; a complete list of the volumes compiled on the subject of odour can be written on a postcard. Mr. Moncrieff's volume* is therefore a welcome addition to this small group, not only because it fills a gap and provides a modern successor to the older works, but also because of the care and trouble which the author has taken in compiling it.

Mr. Moncrieff has taken as his theme the whole study of taste, odour, and the general chemical senses and their impingements on ordinary and scientific topics and has thoroughly sorted and documented most of the relevant data. As a result, he has provided us with a long-felt want—a compendium of information on this important subject, bringing together data which are disseminated throughout the literature, usually among journals not readily accessible to the ordinary technical reader. Mr. Moncrieff has accomplished his task well, and almost all aspects of the science (if such it may be called) of taste and odour are covered. The chapter headings—The chemical senses, Structure of chemical sense organs, Sensation, Olfaction, Gustation, Common chemical sense, Chemical sensibility in lower animals, Classification of odours, Chemical constitution and odour, Taste and constitution, Physical properties of odorous materials, Theories of odour, Perfumes and essences, Flavour and food—indicate the broad range of the work.

* *The Chemical Senses.* By R. W. Moncrieff, B.Sc., A.R.I.C., F.T.I. Pp. vii+424. London, 1945. 25s.

Apart from the few trivial errors inherent in any first edition of a work of this nature, the only criticism that can be made of Moncrieff's treatment of the subject is that he has held his critical faculty too much in restraint. For example, in chapter 12 (theories of odour) he gives an excellent chronological account of the various theories that have been put forward from time to time to account for the variation of odour from substance to substance. Many of these are mutually exclusive, and some, such as that of Müller, are demonstrably untrue, but the author refrains from exercising his critical privilege and leaves the reader to choose for himself. In the reviewer's opinion this is mistaken modesty, for Mr. Moncrieff has evidently thought long and earnestly on these topics and his own views would have been worth having.

Examination of Müller's Theory

Incidentally, readers of this journal may themselves care to examine Müller's theory that the odour of substances is due to their dipole moments by considering Tables I and II.

These tables speak for themselves. If odour is a function of dipole moment, the odour of water should lie between that of acetone and ethyl bromide. Table II would indicate that *n*-amyl alcohol, sulphur dioxide and phenol should have identical odours. One cannot but feel that Mr. Moncrieff could have added sidelights on many of the theories of chapter 12, which would have been equally revealing. However, perhaps the author is wise in not entering so controversial a field and in reserving to himself the privileges of an impassive chronicler.

TABLE I

Substance.	*Dipole Moment.* $\mu \times 10^{18}$ *E.S.U.*
Acetone	2·84
Water	1·85
Ethyl bromide	1·78
Methanol	1·67
Chloroform	1·05

TABLE II

Substance.	*Dipole Moment.* $\mu \times 10^{18}$ *E.S.U.*
Water	1·85
Sulphur dioxide	1·66
n-Amyl alcohol	1·66
Phenol	1·65
Ammonia	1·55
Phosphine	0·55
Carbon disulphide	0

Personally, I must beg leave to differ with him on the subject of the meat taste, for on p. 111 he states that "most of its 'taste' [meat] is odour, and anosmic people cannot distinguish between meats by taste," while he concedes on p. 270 that "sodium *d*-glutamate has an intense meat-like taste." In *Flavours* (1938, **1**, p. 29) I gave a summary of the development of knowledge on the meat flavour and showed that it is difficult to see how the tasting of sodium *d*-glutamate (which in pure state is non-volatile but sapid) can really be related to the osmic sensorium. It must, I think, be conceded that this taste *is* a taste (and not a smell) and that it cannot be synthesised by any combination of the four accepted tastes—sweet, sour, bitter, and salty. In the circumstances, it becomes possible that the taste group should be widened to include a fifth, or meat, taste. This is not quite so surprising a recommendation as might appear at first sight, since it has already been abundantly apparent that sucrose, saccharin and dulcin do not act on the same group of taste buds and that their sensations must be considered as different "sweetnesses"!

As to the trivial errors inherent in the production of technical books, these are singularly few. One notices, for instance, the confusion of spelling in "perylla" and "perilla" (pp. 271, 326, 336, 412); and the mind does not now readily accept $\equiv N \equiv$ for covalent nitrogen (p. 272); "salivum" for "sativum" on p. 326; and other similar little matters can be corrected in a future edition.

The writer of this review would plead for the inclusion of allyl caproate among the esters, as it is the basis of all modern pineapple flavours; the inclusion of dibenzyl among the valuable perfumery hydrocarbons; and the inclusion of the ivy irritants among the examples of common chemical activity.

Mr. Moncrieff is to be congratulated on having completed a difficult job well, and his volume will be of permanent value in the literature of this field. In addition, the publishers are also to be commended, not only in their choice of author, but in producing the book so well, despite the restrictions of the war economy standards.—G. M. DYSON.

The Preparation of Apple Rings

IN any commercial fruit-growing district the disposal of low-grade fruit with a reasonable return to the fruit grower is a problem. If this fruit is dumped on the market as raw fruit the price for the better grades is depressed. Consequently a successful fruit-products industry is necessary to any large fruit-growing district.

In the fruit-growing districts of Nova Scotia the main crop is apples and the fruit-products industry is built around this crop. Plants are in operation for the manufacture of fruit-juice products; apple juice, cider, cider vinegar, cider concentrates; canned goods, both solid and water packs; and dried fruit, both dehydrated and evaporated. By far the largest amount of apples is used up in the manufacture of dried fruit.

The following is the method used for the preparation of apple rings:

Washing. Fruit should be washed before peeling to remove grit and dirt. A well-constructed concrete tank with water in continuous flow makes a good washer for this purpose.

Paring and Coring. Various types of equipment are used for this purpose. For apples of 2¼ inches and over a ⅞-inch coring knife is satisfactory, as it leaves less seed cell than the standard ¾-inch knife, although the waste is increased by about 10 per cent.

Slicing. Fruit may be sliced into rings or into quarters, sixths or eighths. The most commonly used system is ring slicing.

Sulphuring. It is necessary to bleach apples with sulphur before drying. This may be done either by gas or by first combining sulphur dioxide with water and using the solution as a bleach. The common

method is to use gas. Sulphur is burned in a specially constructed stove, and the fumes are carried from this to the bleacher. This may be a slatted conveyor inside a gas-tight box for bleaching whole apples, or a cabinet for holding the trays of apples for bleaching the slices. The endless conveyor is usually 30 inches wide and made of slats 1 inch × 2 inches, close enough together to prevent apples and apple pieces from going through and yet to allow free passage of gas through the fruit. The slats are fastened to endless-link chains, which are driven from a worm gear. The gear ratio is such that the fruit moves the complete length of the chamber in the bleaching time required. The conveyor is usually about 40 feet long. The whole arrangement is enclosed in a gas-tight box. Gas is introduced from the sulphur stove at the same end at which the pared whole apples are introduced. A chimney is provided at the other end of the box to carry the fumes away and to create a draught. The apples are usually fed to the box from an endless conveyor. Thorough impregnation of sulphur is necessary to produce a satisfactory ring. As whole apples they should be exposed to heavy sulphur fumes for at least 45 minutes; as rings, 30 minutes will produce excellent results. It is necessary that the fruit should be exposed to sulphur fumes as soon after paring as possible in order to prevent browning. If this cannot be done, spraying with a 5 per cent. solution will retard discoloration and shorten the required time of bleach.

Drying. The drier may be a single or double tunnel, the single one having several advantages in operation. The apple rings are put on trays and these are put on trucks. Drying is carried out in two stages, in the "wet" and "dry" tunnels respectively. The two tunnels are built side by side, the casing being of brick with outside cavity walls to reduce radiation losses. The doors are of the overhead lifting type. Each tunnel is equipped with a double inlet, bottom horizontal discharge, centrifugal fan with independent motor and clutch; the wet and dry fans deliver respectively 50,000 and 35,000 cubic feet of air per minute. Air heating is by gilled tube steam heaters.

Recirculation of the air is employed in both tunnels, the return ducts being overhead. Fresh air enters the return duct of the dry tunnel only, and the final exhaust is from the outlet end of the wet tunnel. The make-up air for the wet tunnel is drawn from the dry tunnel return duct. A series of louvre dampers is provided to control the degree of venting and recirculation.

The function of the wet tunnel is to remove the bulk of the moisture, and parallel flow of stock and air is employed so that the wettest vegetables are in contact with the hottest air. The dry tunnel functions largely as a conditioner and counter flow is then used with the driest air meeting the driest material. The air inlet temperatures to the tunnels are the maximum which the vegetables can stand without scorching developing during drying. These allowable temperatures vary with different vegetables; for the wet tunnel, the inlet dry bulb range is 185° to 210° F., and for the dry tunnel 140° to 160° F. The wet bulb temperature in the wet tunnel is 105° to 115° F., but this can be varied over wider limits by altering the quantity of air recirculated.

Each tunnel holds two trolleys abreast, guide rails being provided. A pair of trolleys containing 100 trays, each 8 square feet in area, is inserted in the wet tunnel at intervals of 25 to 30 minutes, and simultaneously a pair is withdrawn from the wet tunnel outlet. This latter pair is then inserted in the dry tunnel after a trolley pair containing the final dry product has been withdrawn. The trolleys are inserted in the wet tunnel and withdrawn from the dry by means of side entry traverser bogies, but are swung round by hand from the wet tunnel outlet to the dry tunnel inlet. Mechanical pusher gears are provided in each tunnel for moving the lines of trolleys forward.

The drying operation is an expert one and obviously must be controlled by specialists. One of the main items of the drying operation is the strict control of temperature, especially during the critical period towards the end.

When the fruit is nearly dry its temperature approaches that of a dry-bulb thermometer. At this stage temperatures about 165° F. tend to produce browning.

Curing. After the fruit is dried it should be cured to equalise moisture in the rings. Some rings are always on the dry side, others are very wet. These wet rings would ultimately start deterioration if the moisture were not equalised. A curing room should be provided with bins, good hardwood floors, and should be heated so that the humidity of the air can be partly controlled; the rings should be piled not more than 4 feet deep in an even manner over the floor of the bin and turned over every 24 hours until curing has taken place. The drier rings will absorb moisture from the wetter rings, and *vice versa*. If a bin is too wet or too dry a dry or wet batch can be taken from the dehydrator and worked in to lower or raise the moisture content as desired. Usually, at best, a week is required for curing.

Screening. The product after curing should be thoroughly screened to prevent chips, seeds and seed carpels. A screen with 1 inch mesh is satisfactory. The chips should be again screened through a ⅛-inch mesh screen to remove seed carpels and seeds.

Abstracted from "Principles and Methods Involved in Dehydration of Apples," by C. C. Eidt. Publication 625. Dominion of Canada, Department of Agriculture.

Cookery and Herbal Remedies

MRS. CALLOW has written a very useful handbook* showing how the preparation, cooking, and processing of food affect its nutritive value.

An introductory chapter gives an up-to-date account of the different constituents of food, and subsequent chapters deal individually with meat, fish, vegetables, fruit, milk, butter, cheese, eggs, and cereals. These sections are packed full of information set out in the most lucid manner, and prominence is given to recent scientific work which has not hitherto reached the text-books.

There are also sections on salad preparation, jam making, fruit bottling, canning, refrigeration, and dehydration.

Wartime foods, including household milk, dried eggs, and National bread, are also discussed.

This book can be highly recommended as a source of clear and authoritative information on the subject and is particularly useful for quick reference.

* *Cooking and Nutritive Value.* By A. Barbara Callow. Pp. 156. London. 7s. 6d. net.

The Herbal Cult

There are still places where the herbal cult flourishes. I do not know whether the Berliners used their linden trees for medicinal purposes, but in Chile, *tilo*, the dried flowers of the linden tree, is a popular remedy for colds, and is certainly excellent as a diaphoretic.

Mary Thorne Quelch has written her second book on herbs*—this time from a medicinal aspect. Her attitude towards the subject may be gathered from a paragraph in her foreword :

> Thinking purely of our bodily needs it will be found that remedies for most of our ills are waiting to our hands in herb garden and shop and kitchen cabinet as well as in the chemists' stores. Herbs, fruit, cereals, vegetables, simples of every type, are the salves which God has sent to heal our ills. It is for us to use them aright, since to neglect them is to throw away our greatest treasure—good health.

The book is arranged encyclopaedically, beginning with Abscesses and ending with Wrinkles, the paragraphs being headed indiscriminately with names of ailments and remedies.. Mrs. Quelch is catholic in her selections, as she includes citric acid, cod-liver oil, etc., among the remedies.

Early in the A's the critic with a tendency to captiousness will find slight inaccuracies. For instance, a 5 per cent. solution of agar-agar is recommended as a jelly—some jelly! It should have been 1 per cent. agar. Beetroot is described as a fruitful source of vitamins " almost as valuable as oranges." Reference to the tables would have obviated this.

Colds and coughs have been valiantly tackled ; in fact, nine pages are dedicated to them. The author is evidently very interested in old legends, and it would almost appear that as she writes about them she hypnotises herself into believing many of them. Referring to the wearing of amber beads to cure or prevent goitre, she knows of " a very sensible woman who believes that the steadiness of her nerves and her freedom from headaches are owing to her wearing an amethyst necklace. And this is not superstition, at least in the ordinary sense. It is a belief that the vibrations of the stones have an effect on the body." She ends by the question : Who shall say that within another decade the lessons taught by John of Gaddesdon (physician to Margaret, wife of Edward I) may not be amply justified?

There is not space enough to give the walnut cure for sore throats, or to do more than pass on the news that gooseberries cure jaundice, and carrot tea alleviates gout, but on the principle of trying everything once, grey-haired readers may like to try a concoction of tea leaves and sage as a hair restorative.

Despite her tendency to start a paragraph with " I believe," and " Someone told me," the author gives a lot of sensible advice, and her little anecdotes are amusing. She includes some useful recipes for invalid cookery and some notes on first-aid treatment. The book is eminently readable.—T. C.-W.

* *Herbal Remedies.* By Mary Thorne Quelch. Pp. 272. London. 8s. 6d. net.

Australian Fruit Preservation

A SKIN coating of castor oil and shellac in alcohol has been found, by the New South Wales Department of Agriculture, to be the most effective method of increasing the life of apples in cool or unrefrigerated storage, according to the eighteenth annual report of the Australian Council for Scientific and Industrial Research. Disadvantages are, however, that the treatment sometimes produces lenticel spotting and an alcoholic flavour. Wax emulsions, though most effectively controlling weight loss, caused injury to the calyx, and did not prevent decolorisation.

Granny Smith, Democrat, Delicious, and Jonathan apples can be stored in an unrefrigerated place for a considerable time after such treatment, and various senescent disorders of cool storage are reduced. Superficial scald can be controlled by wrapping Granny Smiths in layers of oiled wraps, and an emulsion of peanut oil considerably reduces its incidence.

Satisfactory wax and oil emulsions, which are apparently non-toxic, were prepared during 1944, and wilting and colour change can be controlled, to a certain extent, by an emulsion of viscose medicinal paraffin oil.

Weight loss can be reduced, in certain vegetables, by 50 per cent. Experiments are being carried out to study the effect of treatment on nutritional value.

Dehydrated apple rings prepared from Tasmanian Sturmer Pippins were sulphured by dipping in solutions of sodium metabisulphite and dried in a tunnel dehydrator. Samples ranging in moisture content from 3 to 25 per cent., and in sulphur dioxide concentration from 500 to 2,000 parts per million, were prepared and stored in sealed lacquered cans at 65°, 86°, and 98° F. During storage the sulphur dioxide content dropped to a minimum value and the fruit became brown. With the increase of 10° C. in the storage temperature the sulphur dioxide increased 2 to 2·5 times. The length of time taken to discolour was the same over a range of 15 to 25 per cent. moisture, but considerably more when the initial water content decreased to 10 per cent.

The moisture content of dried apples in Australia should be 18 per cent., and at this level should contain 2,000 to 4,000 parts of sulphur dioxide per million at the time of packing.

In the past pears, apricots, and peaches have been sun dried, as this method gave a better colour than dehydration. It has now been found, however, that equally satisfactory results can be obtained by steam-blanching the fruit before it is sulphured. This treatment reduces sulphuring and drying time, and, by overcoming case hardening, permits drying to be carried out at a higher temperature.

Pears, of 10 to 12 per cent. moisture, can now be prepared in six hours instead of the thirty hours previously required to dry them. Slices ¾ in. thick are blanched and sulphured and then dried at 145° to 165° F.

Steam-blanched apricots have been dried to an attractive product of 12 per cent. moisture in a tunnel dehydrator at 135° to 150° F. in 14 hours. By this method, as well as by dipping in solutions of sodium citrate or sodium metabisulphite before sulphuring with fumes of burning sulphur, larger quantities of sulphur dioxide were retained in the fruit.

Trade News

Quick-Freezing Plants

The Herring Industry Board quick-freezing plant, which has been working in Fraserburgh for the season, has now closed down after preparing about 300 tons of herring.

The Mac Fisheries, Ltd., quick-freezing plant there has also closed down for the season. It is as yet too early to assess the value of this first year's run, as many factors must be considered in any final assessment. One disappointment was that the plant was not fed with the required 50 crans per day to keep it functioning at top performance, despite the fact that the season has been one of the best on record. The two main port catches, at Fraserburgh and Peterhead, alone amount to over £1,000,000.

Shark Fishing in Scotland

Tests as to the edible quality of shark's flesh are being carried out in Glasgow and London. Samples of shark's flesh have been provided for this purpose by Major Gavin Maxwell, who is now running a shark factory on the little island of Soay, near Skye. Major Maxwell made his first two catches recently of two sharks weighing 11 and 5 tons respectively. Samples of the flesh have been sent to fishmongers, zoos, farms, and cat and dog homes. While it is not supposed that the flesh would ever take the place of fish, it is regarded as a probable useful substitute during a shortage, and as a definite addition to cattle feeding. Shark's flesh, according to Mr. G. N. Davidson, Glasgow fish salesman, who handled the delivery for testing in Glasgow, looks extremely palatable. The flesh, he says, has an extremely fine texture, and the fact that sharks feed on plankton, on which herring also subsist, places them in the category of "clean" fish, and gives them a high protein value.

Firm's New Enterprise

Messrs. L. Sterne and Co., Ltd., Crown Iron Works, North Woodside Road, Glasgow, who have been manufacturing refrigerating plant for the past sixty years, are proposing, in conjunction with Scottish Industrial Estates, to build a further factory at Hillington, Glasgow, to develop and expand the production of domestic cabinets, ice cream cabinets, frosted food cabinets, and other small refrigerating plant. The new factory, of 50,000 square feet, has been fully planned and licensed, and the directors hope to go into production next summer.

OBITER DICTA

- Sausages are now almost unobtainable.—*Anon.*
- I have come to the conclusion that old England is the best place to live in.—*Member of the R.A.F. in Germany.*
- Take my place for a week. If you succeed in forgetting the shortage, the customers soon remind you.—*London butcher.*
- There is not enough food in the world to provide rations on the scale which any of us think desirable.—*Sir Ben Smith.*
- The points system is all ballyhoo and not workable.—*Mr. Sidney Cullen, managing director of Cullen's Stores, Abingdon.*
- People are tired of hearing about calories and vitamins, when what they really need today are plenty of chops.—*The Mayor of Grimsby.*
- You think of Spick—that's what we are going to call our new product. Old soldiers will have a fine time with that.—*Mr. Jay Hormel, maker of Spam.*
- Guinea-pigs used for medical research are vanishing from the market Scientists say they are now to be found in the restaurants served as "chicken."—*"The Observer."*
- The truth is that outside Europe, and excluding the area recently under the Japanese, there is scarcely a country not feeding better in relation to its pre-war standards than we are.—*William Mabane.*
- Nothing is more certain than that the conversion of meals into chemical formulae, and the invasion of the kitchen by the riff-raff of the scientific world is rapidly producing a race of priggish hypochondriacs.—*Beachcomber.*
- Don't fly off in a huff if some suggestion given you isn't quite the same as the advice handed down from your great-grandmother. She was a very clever old lady, I'm sure, but several new facts have been discovered about food since her time. Maybe she never used a gas cooker. Certainly she hadn't to use a ration book. We've got to try to go at least one better than great-grandmamma.—*Sir Ben Smith.*

Food Machinery for India

Mr. Norman Neville, director of the Food Machinery Industrial and Export Group and of the British Chemical Plant Manufacturers' Association, is leaving for India to discuss with Government Departments and industrialists their long-term requirements for food machinery and chemical plant.

Editorship of "The Analyst"

After having been editor of *The Analyst* for twenty-five years, Dr. C. Ainsworth Mitchell has retired. He will retain a literary connexion with the Society of Public Analysts as honorary librarian.

Dr. Mitchell will be succeeded as editor by Mr. J. H. Lane, who has been assistant editor since 1936. Future communications relating to *The Analyst* should be addressed to Mr. Lane at 7-8, Idol Lane, London, E.C. 3.

Captain T. Bartie

Captain T. Bartie, who for nearly twenty years has been a notable figure in the sugar beet industry in Scotland, has retired under the superannuation scheme of the British Sugar Corporation, Ltd. He joined the staff of the original Second Anglo-Scottish Beet Sugar Corporation as an agriculturist before the building of the factory at Cupar, where ever since he has been in charge of the agricultural department.

Captain Bartie will be succeeded by Mr. F. W. Sutton, formerly of Brigg.

Changes of Address

Notices of the following changes of address have been received:

The Incorporated Association of Purveyors of Light Refreshments, 185, Piccadilly, London, W. 1. Tel.: Regent 6196.

Selected Products Co., 39-41, West Hill, Wandsworth, London, S.W. 18.

Skerrybahn Dairies, 49-53, Trafalgar Street, Belfast.

The Food Machinery Industrial and Export Group, 26, Portland Place, London, W. 1.

Edme, Ltd., Imperial House, 84-86, Regent Street, London, W. 1.

Foreningen Skanska Andelss Lakterier, Kontorscentrum, Malmo, Sweden.

Edwin Lundgrens, c/o Messrs. Wennergen-Williams, Drottningatan 71D, Stockholm, Sweden.

Chokladfabriken Marobou, Sundyberg, Sweden.

Oilseeds Market Review

A comprehensive "Review of the Oilseed, Oil and Cake Markets for 1944" has been issued by Frank Fehr and Co., London. It includes forecasts of the 1945 oil seed crops and exports, and oil and fats production.

Partnership Dissolved

The partnership between Mr. W. M. Seaber, Mr. A. C. Davall, and Mr. R. A. Rabnott has been dissolved. Mr. Seaber and Mr. Rabnott will carry on the businesses of Salamon and Seaber and Halse and Marshall at 33, Trinity Square, London, E.C. 3, and Mr. Davall will carry on the business of John Hughes at Oak Avenue, Hampton, Middlesex, and City Office, 110, Cannon Street, London, E.C. 4.

Association of Scientific Workers

Mr. Roy Innes, B.Sc., has been appointed general secretary of the association, which was registered as a trade union in 1941, and affiliated to the Trades Union Congress in 1942. By virtue of the size and activity of its membership, and through its public conferences and the wide range of problems on which it has made public representations, the Association has achieved an important place as the body which represents the social and economic interests of scientific and technical workers throughout Great Britain.

Automatic Regulators

We have received from Elliott Brothers (London), Ltd., a copy of a revised edition of List 815, which deals with the latest developments of their automatic regulators for heat control. These regulators have a special application in connexion with steam generating plant, boilers, and food manufacturing processes generally, for temperature and humidity control and gas analysis.

Proposed Census of Distribution

The proposed census of distribution to be taken at the instance of the Board of Trade was mentioned at a recent meeting of the council of the Liverpool Chamber of Commerce.

It was reported that the General Trade Committee of the Chamber had considered a letter from the Association of British Chambers of Commerce, which drew attention to a letter from the Census of Distribution Committee of the Board of Trade and invited the views of the Liverpool Chamber as to the form in which evidence should be collected from the various distributive trade organisations.

The General Trade Committee agreed that suggestions submitted to the Census of Distribution Committee now would probably be of little value three years hence. It was decided to ask the Association of British Chambers of Commerce to recommend the Census of Distribution Committee to leave the matter in abeyance until nearer the time of the proposed census.

The self-contained Unit Dust Collectors in operation.

Goodbye to Millwall

After fifty years of service Maconochie's Millwall factory, which was one of the pioneers of Canned Ready Meals, has had to close. It was badly blitzed in 1940, and the difficulties of rebuilding it are at present insuperable. The company's activities have now been transferred to Hadfield, while the Fraserburgh factory still continues a 100 per cent. output. A farewell staff dinner and dance was held at Millwall on August 30, at which Mr. Chalmers, managing director, and Colonel Harding, formerly chairman, were present.

Scientific Films

The Scientific Films Committee of the Association of Scientific Workers has now revised and printed its catalogue of scientific films. A grading system shows the suitability of each film for various types of audience. This catalogue can be purchased at 2s. 6d. per copy from the head office of the A.Sc.W., at Hanover House, High Holborn, London, W.C. 1.

The committee was set up in 1938 with the object of furthering the interests of the scientific documentary film, encouraging the making of more such films and sponsoring the exhibition of scientific films. It is prepared to act in an advisory capacity on the subject of scientific films to scientific and engineering organisations, college societies, schools, and film societies.

New Dust Collector

A completely self-contained Unit Dust Collector, known as Drymat, is being supplied by Dallow Lambert and Co., Ltd. It is suitable for handling practically all types of dry dust, whether of organic or inorganic nature, ranging from the collection of grinding or polishing dust to various powders used in food manufacture, such as the spurt of dust often attendant on bag or carton filling machinery, etc. It comprises a steel cabinet which houses a fan, totally enclosed motor, primary dust separator, filter, filter shaking mechanism, and dust drawer. In operation the sequence is as follows: Entry into a low velocity chamber where the heavy dust is deposited into the drawer, filtration through specially designed fabric mats, cleaned air then passing through the fan and thence either back to the shop or to the atmosphere. The light dust is deposited on to the outside of the filter mats, and the operation of the shaking handle on the end of the unit enables the pores of the filtering medium to be maintained at an efficiently clean level. The dust or powder collected is easily emptied out of the dust drawer for re-use.

Cambridge Instrument Co., Ltd.

A well-illustrated brochure to mark their Jubilee has been issued by the Cambridge Instrument Co., Ltd. This gives details of the progress made in the manufacture of scientific instruments during the past fifty years.

New Deep-Water Quays

At a recent meeting of the Leith Dock Commissioners an agreement to lease an area of four acres in the Western Extension to Joseph Rank, Ltd., flour millers, London, was confirmed. This is the first stage in the provision of sites for industries mainly connected, with import and export of goods by sea.

Messrs. Rank will construct on the site, which is partly reclaimed land and partly water, deep-water quays for the berthing of vessels bringing grain cargoes from abroad. Modern plant for the discharging of these grain cargoes into a large silo or storage warehouse situated in close proximity to the unloading berths will also be erected. The most up-to-date flour mills and other ancillary works for the manufacture of feeding stuffs will be built, and the estimated cost of the works will be over £750,000.

World Wheat Prospects

The International Wheat Council, comprising representatives of the Governments of Argentina, Australia, Canada, the U.K., and the U.S., held its ninth meeting in London recently.

The Council elected as its chairman Mr. Leslie A. Wheeler, director of the U.S. Office of Foreign Agricultural Relations, in succession to Mr. Paul H. Appleby, who resigned the post recently when he left the service of the U.S. Government.

Reviewing the present and prospective world wheat position, the Council concluded that the present estimates of the world's import requirements for the year ending July 31, 1946, exceed by a substantial margin the present estimates of the supplies available for export during that period from Argentina, Australia, Canada, and the United States.

The Council believes, however, that, provided rigid controls of feeding of wheat to livestock are maintained in both exporting and importing countries, and that so far as practicable war-time extraction ratios are also maintained, it should be possible to increase the supplies of wheat available for export sufficiently to meet in full the import requirements for direct human consumption.

Recommendations have therefore been made to the Council's constituent Governments to take all the steps necessary to ensure that the maximum amount of wheat is made available for human food.

International Conference

An international conference on food and agricultural statistics, organised by the Emergency Economic Council for Europe in co-operation with UNRRA, the Interim Commission of the Food and Agricultural Organisation and the Combined Working Party on European Food Supplies was held in London from September 17 to 22. Delegates from Canada, Belgium, Denmark, France, Luxemburg, the Netherlands, Norway, the United Kingdom, and the United States, together with observers from Czechoslovakia, the U.S.S.R., Yugoslavia, the Combined Food Board and the Allied Missions in Germany, Austria, and Italy, attended the meetings. The main object of the conference was to study methods of assembling comparable statistical material as rapidly as possible on the food and agricultural situation of the liberated countries for the purpose of facilitating an equitable distribution of supplies.

Egg Packing

The form of egg-marketing, which will in due course supersede existing control, was touched upon at the fourth annual meeting of the Scottish Federation of Egg Packing Stations held in Glasgow recently. Mr. George Gordon, Kemnay, the retiring president, said that, with one exception, all packing stations in Scotland are members of the Federation. The chairman reviewed the difficulties the packing stations had to contend with during the war years, and declared that they had done a splendid job and deserved full recognition for it.

Mr. Donald S. Weir, Leith, who was elected president, said there had to be faced at some time a change over from Government control to some other form of marketing. In the experience of the Federation in meeting with other parties, they had found unanimity in the trade. What was wanted was a well-balanced, properly organised trade, in which each section played its part throughout without overlapping the other. While their first interest was that of packers, he pointed out that the Federation had always the interest of the home producer at heart. Mr. Weir paid tribute to the services of Mr. Gordon, who had founded the Federation.

It was agreed to accept an invitation to send two representatives to a meeting in London which is being arranged by the National Council of Wholesalers, in connexion with the formation of a National Egg Council.

Golden Ring, Ltd.

The title of the River Preserving Co., Ltd., has been changed to Golden Ring, Ltd. Address: Rosebery Avenue, Tottenham, London, N. 17.

Motor Application Research

The majority of electric motor troubles experienced in service are developed directly from incorrect initial application, according to investigations made by Crompton Parkinson, Ltd. Motors were selected without due regard to all the factors involved. During the war an increascreasing number of incorrect applications—probably due to peak production demands—have been noted. Failures are too often attributed to a defective motor when the real reason is incorrect application—sometimes due to a lack of appreciation of the varying characteristics of the motors available.

To ensure correct motorisation based on exact data, it was decided to form a "Motor Application Research Department" to co-operate with the motor users. This department acts in conjunction with the sales department to give "service before sales" as distinct from "service after sales." Thus, in those cases where pre-installation investigation is essential, "Motor Application Research" ensures correct scientific application, minimising the risk of failure in service. When application investigations are made a comprehensive report is submitted to interested parties.

Ice Cream Trade Luncheon

The price regulation of ice cream issued recently by the Ministry of Food has had a good effect already, according to a statement made at a recent luncheon at the Waldorf Hotel, London, at which the Minister of Food, Sir Ben Smith, was entertained by the Ice Cream Trade Associations. The regulation is that ice cream prices should not be more than 50 per cent. above those charged for similar portions and service before the war.

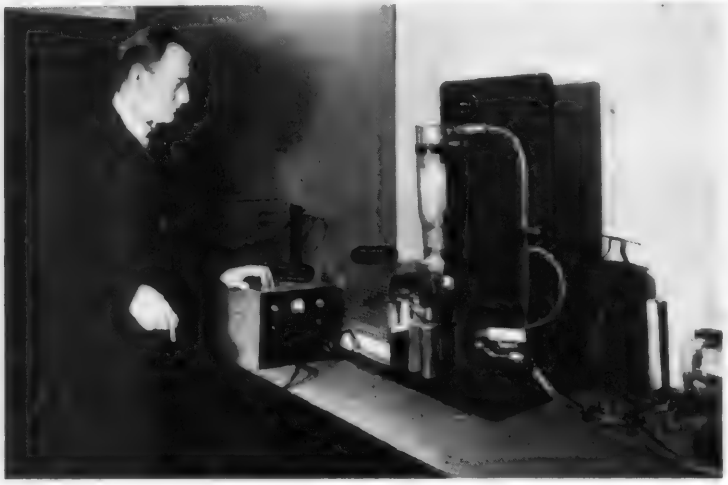
Mr. Anthony Facchino, President of the Ice Cream Alliance, suggested the setting up of a Development Council for the industry. He said that 450 million gallons of ice cream were sold in the United States last year and that Canada, with her population of only 11 million people, eats as much ice cream as Britain's 48 million—about 20 million gallons a year. He agreed with Mr. S. I. Salmon, chairman of the Wholesale Ice Cream Federation, that the industry desired to co-operate to the fullest extent with the Ministry of Food for the protection of the public and to build up a worthwhile trade by selling good quality products.

L. A. Mitchell, Ltd.

L. A. Mitchell, Ltd., chemical and industrial drying engineers, have now resumed business at their pre-war address, 37, Peter Street, Manchester, 2. Tel.: Blackfriars 7224.

Radio Heating Exhibition

DISPLAYS OF ITS APPLICATIONS



Redifon Radio Heating applied to the drying of powder and tablets in bulk.

THE primary aim of the world's first exhibition of radio heating organised by Rediffusion, Ltd., and opened by Sir John Anderson at Dorland House on September 20, was to explain what it does, how it works, and what it can do for industry.

The exhibition was arranged in four sections:

1. Examples of products which are, or will be, subjects for Redifon Radio Heating.
2. A simple step-by-step story of how radio heating is produced.
3. A comprehensive array of practical demonstrations covering plastics, glues, steel, clay, rubber, wool and textiles, chemicals and pharmaceuticals, indicating how these and many more important materials can be treated.
4. A small lecture theatre in which an illustrated introduction to the principles of radio heating was shown at regular intervals each day.

In the first section a number of attractive displays were seen showing examples of products from the plastics, rubber, metals, timber, chemicals, and miscellaneous industries.

In section 2 was shown a flow sheet diagram, illustrating how ordinary A.C. electric power at 50 c.p.s. is transformed into radio heating power at frequencies of over 1,000,000 c.p.s. This diagram was translated into physical reality by a display of components such as transformers, valves, condensers, etc., at appropriate points along the flow sheet. Several circuit drawings of actual radio heating generators were also displayed.

In section 3 working examples were shown illustrating the practical application of Redifon Radio Heating to a number of representative industries. The Plastic Moulding sub-section contained two working exhibits, illustrating the pre-heating of moulding powder before it is placed in the usual steel moulds and subjected to pressure. The sum total of the advantages of Redifon Radio Heating is that entirely new avenues are open to the moulding industry to make articles which have hitherto been uneconomic or even impossible.

Drying Operations

In another section the ability of radio heating to produce heat uniformly through the material demonstrated its advantages when applied to many drying operations. The method may be applied to the drying of substances such as grain, vegetable fibres and powders. An interesting exhibit was that showing the drying of bottles of powder and tablets down to an extremely low moisture content. Under vacuum it is possible with delicate substances like penicillin to dry out rapidly in this way at temperatures down to zero centigrade. Although not strictly a drying process, but closely akin, was the rapid continuous concentration of chemical solutions which are sensitive to temperature above a critical limit. This was achieved by feeding the solution down through two bulbs, which trap any rising foam, into a glass cylinder on each side of which is an electrode. The liquid boils in here, energy being furnished by a Redifon R.H.2 generator. The top globe is connected to a pump which maintains a vacuum sufficient to lower the boiling temperature to the required figure—in this case about 20° C. A constant level device collects the concentrate, which is usually two to four times stronger than the incoming solution. A special feature is a device in the boiling chamber, for preventing the formation of air bubbles by ensuring constant circulation of the liquid. This avoids setting up Geissler discharges and consequent oxidation of the solution.

Cooking of Food

Can radio heating be applied to the cooking of food? That certain cooking operations can be done by radio heating is well known, but it is sometimes credited with powers that it does not possess, particularly that of turning out perfectly cooked joints in three minutes—a spectacular performance which so far only exists in fantasy. There is, however, one useful and appetising product which may yet become popular in milk bars and restaurants—the radio-heated sandwich. A regular mid-morning item in the laboratory of the company was presented in the galley buffet, where three R.H.21 sets warmed such light refreshments for those visitors who cared to try the experiment for themselves.

The foregoing only touches partially on the many exhibits which were shown. The exhibition should stimulate many fresh ideas in radio heating as well as leading to its use for known applications.

Sandwiches are heated through in less than a minute without drying or toasting.

Edinburgh Exhibition

The Scottish fishing industry is given special prominence in the "Meet Scotland" exhibition now opened in the Royal Scottish Museum, Edinburgh. Although naturally a much smaller display than the very excellent fishing industry exhibition of some months ago, the present display, as part of the general coverage of Scottish industries, demonstrates the importance of the fishing industries in the nation's food production plan.

Aberdeen is given prominence, photographs and statistics demonstrating its importance as capable of landing 130,000 tons of fish per annum. Other ports in the north-east are shown in photographs, together with appropriate statistics. Two large charts show the exports of herring from the various ports, demonstrating Germany and Poland as largest pre-war consumers, while other maps and charts show trawling grounds around Britain and similar data.

Engineering Equipment at Bristol

TRANSACTIONS VALUED AT £1,000,000

AS a result of the exhibition organised by the Bristol Engineers Manufacturing Association, it has been reported that business to the extent of £1,000,000 was transacted. Although primarily a display of engineering equipment there was much to interest food manufacturers.

Orders for storage equipment amounting to more than £100,000 were taken by J. Glover and Sons, Ltd., for their Stormor system, which they claim can effect a 50 per cent. saving in storage room.

Specialising in the design, manufacture, and supply of complete malting, brewing, bottling, and refrigerating installations, as well as mechanical equipment, Geo. Adlam and Sons, Ltd., exhibited, among other items, a selection of stainless steel equipment.

Another exhibitor was the Creamery Package Manufacturing Co., who showed a pasteuriser and general purpose vat used for milk and cream, starter making, cultured milk, etc.

Those interested in hoists, lifts, and conveyor equipment in general visited the stand occupied by C. E. Reed and Co., Ltd. The Douglas industrial trucks of 25-30 cwt. capacity with either fixed or elevating platforms for use with stillages were exhibited by Aero-Engines, Ltd.

Machines shown by H. O. Strong and Sons, Ltd., for the production of labels and small cut-outs attracted considerable attention. This firm also specialise in cardboard and paper moulding, as well as doming and drawing presses for confectionery, food boxes, trays, and moulded novelties.

Display by Geo. Adlam and Sons, Ltd., showing refrigerator and collecting trough, stainless steel vessel and cooling coil, a pulp filter and press, and a pressure regulator.

Companies

Sugar Machinery Merger

The Mirrlees Watson Company, Ltd., engineers, Glasgow, have negotiated the purchase of the well-known business of Blairs, Ltd., manufacturers of sugar machinery and chemical plant, Govan, Glasgow. The shareholders of Blairs, Ltd., have unanimously agreed in their general meeting to accept the offer of the Mirrlees Watson Company, Ltd., for their shares.

The Mirrlees Watson Company, which manufactures sugar and salt machinery, etc., has an issued and paid capital of £537,000, of which £71,000 is in 5½ per cent. £1 Preference shares and £466,000 in £1 Ordinary shares. The Ordinary dividend for the year ended March 31, 1944, was 8 per cent., less tax.

Bristol Industries, Ltd.

The report and accounts of Bristol Industries, Ltd., were presented at the twenty-fifth ordinary meeting of the company held in Bristol recently, at which Captain C. V. Wills, J.P. (the chairman), presided.

The report shows trading profit £50,507 3s. 3d., income from investments, after deduction of tax, £7,236 19s. 8d., and transfer fees £7 5s.—a total of £57,751 7s. 11d. for the five months under review. To this must be added £8,774 4s. 11d. brought forward from the previous account, making a grand total of £66,525 12s. 10d.

From this provision was made for depreciation £1,359 8s. 6d., taxation £35,000, war damage contribution £56 6s. 6d., and dividend on Preference shares for the period £5,416 13s. 4d. These items amount to £41,832 8s. 4d., and leave a credit balance of £24,693 4s. 6d.

£5,000 has been transferred to strengthen the general reserve to £60,000. Trade creditors include an amount considered necessary for deferred repairs. Adequate provision has been made in the accounts for excess profits tax, which has been agreed and settled to October 31, 1943.

The accounts show current assets largely in excess of current liabilities, and the payment of a dividend of 10 per cent. on the Ordinary shares was recommended.

Smithfield and Argentine

Conditions operated even more adversely last year for the Smithfield and Argentine Meat Company, with the result that the outcome of the period was a debit balance of £71,400, against a previous profit of £9,700. After deduction of the credit balance of £46,100 brought in, there is a debit balance of £25,300 to go forward,

after crediting £10,000 of reserves written back. This unfortunate situation, which means that both Preference and Ordinary stockholders are without a return for the third year running, was attributable to exceptional charges amounting to £167,400, arising from taxation and increases in various costs, in addition to £114,600 in respect of provision for writing down stocks, bank interest, and losses on exchange. A detailed statement by the chairman explains the manner in which the terms of the bulk contracts made by the Ministry of Food adversely affect the company, in addition to which delays in payment and shipment have in effect compelled the company to finance the purchases made on Government account.

Montgomerie and Co.

Montgomerie and Co., food specialists, millers, maltsters, etc., has published for the first time since April, 1939, its full accounts for each of the years since that date. Earnings for the most part have shown upward progress.

The latest accounts, covering the year to April 30, 1945, show a profit on the various departments, interest and dividends, etc., of £68,835. This goes against £74,551 for the year before. Expenses, etc., amount to £27,162, against £23,765, fees to £787 (same) and plant depreciation to £526 (£581), leaving £40,360, against £49,418. Deduct taxation of £32,737 (£42,861) leaves a net profit of £7,623, against £6,557.

With £10,208 (£10,176) brought in, the divisible sum is £17,831 (previously £16,733). The dividend on £28,815 5 per cent. Preference takes £720 (same), interim of 5 per cent. on the £69,000 Ordinary £1,725 (same), and second interim of 10 per cent. £3,450—making 15 per cent., less tax, again. The sum taken forward is £11,936.

Stocks amount to £20,351, against £26,084, debts to £18,168 (£19,975), tax certificates to £10,000 (£25,000) and cash to £17,476 (£26,378). The investments show a moderate increase at £76,413, as compared with £68,413. Including goodwill, fixed assets stand at £72,605, against £72,663.

Overseas Items

North American Wheat Supply

The Dominion Bureau of Statistics reports that the record wheat crop which is now assured in the United States will serve to offset somewhat the smaller crop in Canada and the reduced year-end crop in both countries, and states that the total supply of wheat in North America in 1945-6 would appear to be about 10 per cent. less than in 1944-5.—*Reuter.*

Fewer Apples from Canada

Canada has had the worst apple crop in her history and Britain will feel the effects. The crop, badly affected by a prolonged spell of cold and wet weather in the spring, may be insufficient to meet Canadian demands.

Last year Canada sent more than 5,000,000 lb. of dehydrated apples to Britain, but none is expected to be sent this year.—*Reuter.*

Dehydrated Meat for India

A delegation has gone to India and Ceylon to look into the possibility of increasing sales of dried meat in those countries. Samples have been sent ahead of the delegation, with brochures showing how to prepare dehydrated mutton for consumption. The Commonwealth Government invested a substantial sum in dehydration plants with which to provide meat for the United Kingdom during the European war, but now that refrigerated shipping space is available again frozen and canned meat is replacing dehydrated. Australia has lately been sending small quantities of dried mutton to Ceylon, and the Food Commissioner there has expressed satisfaction with it, hence the decision to attempt the development of a larger market.

Food Technology

The Food Department's Vitamin Technology Committee, which met recently, recommended the Government of India to send three experienced officers overseas to work out details of the establishment of a vitamin manufacturing industry in India. Two other committees of the Food Department, which also met recently, recommended that the Food Standards Section should be an integral part of the Institute of Food Technology when set up, and steps should be taken for the switch-over of dehydration industry to peacetime production and its extension.

Egypt's Sugar Production

Egypt at present produces 45,000 tons of sugar more than her domestic consumption, and production may further increase with the extension of sugar-cane culture and the installation of new machinery and equipment.

New machinery to the value of £3,500,000 has been ordered and is on its way to Egypt, and modern sugar refineries will shortly be established in Upper Egypt, thus enabling the country to compete with the most powerful sugar producers in the world.

Disposal of a sugar surplus resulting from the expiration of Army contracts is, at the moment, proving a problem to the Egyptian industry, which has asked the Government to help recover the export market. The Egyptian Federation of Industries has written to the Ministry of Agriculture in support of a demand for a protective tariff on the import into Egypt of foreign sugar. The Ministry's reply is understood to have been that there is no danger of imports at present and that the export of sugar is subordinated to general foreign trade requirements.—*Reuter.*

Brazil's Exportable Rice Surplus

The exportable surplus from the 1945 rice crop in the State of Rio Grande do Sul, representing from 85 to 95 per cent. of the total Brazilian rice exports, may equal about 185 million pounds, which is about three-fifths of the quantity exported in 1944, according to a preliminary estimate from Porto Alegro.

The Brazilian rice surplus from the 1945 and 1946 crops is contracted for purchase by the U.S. and U.K. in accordance with the original agreement of December, 1943, with the exception that the prices are raised by 10 per cent. and the allowable percentage of broken rice is increased from the original 10 per cent. to 20 per cent.—*Reuter's Trade Service.*

Norwegian Fish Trade

Before the war Norway exported nine-tenths of her annual one million ton fish catch. The Norwegian authorities are now endeavouring to resume this export on the largest possible scale, not only to assist Norwegian economy but also to help to feed Europe this winter.

The Norwegian Foreign Office is negotiating with the British, French, Dutch, and Swiss Governments for fish export quotas. An arrangement has already been reached with Sweden for the export of fresh fish to a value of a million kroner. A trade delegation has recently visited Belgium, and an agreement is expected to be signed very shortly providing for a fresh fish export quota.

The Norwegian Ministry of Supply states that negotiations for fish exports to Britain have been proceeding with the British authorities since early summer, but at the moment the British authorities are not interested in importing fish.

FOOD SITUATION IN LIBERATED EUROPE

The third of the series prepared by the U.S. Office of War Information concerned with the critical needs of the liberated people in Europe has just been issued.

Imports of food, estimated at from 10,000,000 to 12,000,000 tons, will be required in the next year to augment supplies in the liberated countries merely to prevent distress, but by no means to restore diet to pre-war levels. UNRRA, which will distribute food in the most destitute countries, has a working goal of 2,650 calories per day, which it has not been possible to reach, and the Director-General recently warned that difficulties in obtaining supplies may make it necessary to reduce the goal to 2,000 calories.

The Food and Nutrition Research Board of the National Research Council points out low-calorie diets (of from 1,400 to 1,700 calories per day) on which millions of persons in the liberated areas have been living in the war years provide for their existence. Such diets for long periods of time would subject some people in the devastated areas to vulnerability of infections and diseases. Even a 2,000 calorie level is regarded as a minimum diet on which people can live without real hardship, disease, and unrest. The Board enumerates the results of an intake of an average of 1,400 to 1,700 calories for a period of six months. It is the judgment of the Board that raising the level from 1,400 to 1,700 calories by an additional 500 calories would for some months obviate the major portion of the bad effects.

The report proceeds to discuss the causes of food scarcity in Europe. Losses of production are attributed to many factors. Europe is feeling the cumulative pressure of the war on her whole agricultural economy. Shortage of manpower and bad weather have been deteriorating factors. Disruption of transportation and ineffective distribution have been further causes. Enumerating the kinds of food which are needed, the report states that the problem of supplying wheat is not expected to be so serious as that of fats and oils, meat, and sugar.

A full analysis of the fat, protein, and carbohydrate requirements is given for the different countries according to the basic physiological needs and customary habits of consumption.

The report concludes with brief descriptions of the food situation and the historical background of the needs in each of the dozen liberated nations.

Industrial Newsletter

We have received a copy of the *Anglo-American Industrial Newsletter* and its publisher has extended an invitation to British manufacturers to send short announcements of new products to the Editorial Office at 8, West 40th Street, New York 18, N.Y., for inclusion, without charge, in the American, Australian, and Swedish editions.

The publication carries advertising, but this is limited to firms desiring to establish agency representation or to obtain a licence to manufacture products which are at present made overseas.

Consisting of a ten-page *résumé* of American industrial developments and issued monthly at an annual subscription of 40s. payable to the British office at Digswell, Welwyn Garden City, Herts., the newsletter lists new products, and reviews processes developed in the U.S.A. Each month a number of bulletins, offered without charge by American manufacturers, are included, these being noteworthy contributions to the literature of the particular industry to which they are addressed.

The titles of the more significant articles appearing in the American trade and technical press, as well as important U.S. patents with a brief description of those selected, are also given.

U.S.A. Canning Caravans

American countrywomen are to receive practical help in saving fruit and vegetables for next winter's supply. The College of Home Economics at Cornell University and the New York State Emergency Food Committee have transformed American Red Cross mobile canteen kitchens into canning caravans, and these will tour the seven counties of the State in an effort to make good the supply of commercially canned food which has been cut by half in the U.S.A. next winter for relief needs.

"Food for Britain First"

Mr. Norman J. O. Makin, Minister of the Navy, Munitions and Aircraft Production, recently told the Australian House of Representatives: "If we have any foodstuffs available for export we should make it available first to our kith and kin in the United Kingdom."

He was speaking after Mr. E. J. Harrison, Deputy Leader of the Opposition, had said that Australia was failing to make trade preparations in Japan for the vital period ahead, while other countries were getting in on the ground floor.

Mr. Makin said: "The inordinate desire of some persons to engage in trade again with an enemy so deeply steeped in crime is one that can find no endorsement from me."—*Reuter.*

Electronic Defrosting

The development of an electronic defroster which will thaw frozen foods almost instantly while preserving their taste, texture and nutritive value, is described in *The Baker's Digest*, June, 1945.

High-frequency heat, which has already done war service in dehydrating army K-rations, has now been successfully harnessed by the nation's leading food distributor as a high-speed defroster of frozen foods in bulk.

Application of the new electronic technique to the baking industry is being pioneered by H. W. Gilb and Dr. William Cathcart, of the A & P Food Stores' national bakery division.

The most recent dielectric test conducted by Dr. Cathcart at the Federal Telephone and Radio Newark (N.J.) laboratory resulted in successful quick-thawing of fully ripened peaches, which are among the most highly perishable foods. Thirty-pound cartons of the fruit, solidly frozen and normally requiring 20 hours to defrost safely, were thawed in less than fifteen minutes with the aid of the megatherm high-frequency process.

The new defrosting method involves use of an "oven" in which the floor and ceiling are insulated metal plates or electrodes which are connected to a high-frequency generator. Frozen food that is placed between these plates is subjected to dielectric heating which reaches the core of the frozen substance as well as its surfaces and induces uniform defrosting.

Tunisian Olive Oil Production

According to *Foreign Crops and Markets*, the 1945-46 preliminary forecast for olive oil production in Tunisia is 22,000 short tons, as compared with an estimated 82,500 tons in 1944-45.

In contrast with the present forecast, the 1944-45 olive crop was the largest on record for Tunisia, and estimates of probable olive oil production were high. Last season, however, olive oil producers were greatly concerned over the lack of adequate storage space. This problem, in general, was solved in a satisfactory manner by various emergency measures. When the season ended the quantity of oil entering legitimate marketing channels was not found to have come up to earlier predictions, and a downward revision was made in the estimate.

There will probably be little olive oil available for export, according to forecast indications, since domestic requirements, estimated at 33,000 short tons annually, are in excess of this season's small output. Other cheaper edible oils, if available, may be imported, and a limited quantity of the more expensive olive oils may be exported for the purpose of obtaining foreign exchange.—*Reuter.*

News from the Ministries

Air Mail to Australia and New Zealand

Pending re-establishment of unrestricted air mail service to Australia and New Zealand, H.M. Government have made arrangements as from September 25, 1945, for a limited air mail service to supplement the present service by air to North America and thence by surface route.

Full details may be obtained from the Department of Overseas Trade, Hawkins House, Dolphin Square, S.W. 1.

Use of Mineral Oils

Bakers and other food manufacturers are warned that in the interests of health the use of mineral oil as an ingredient in food is both undesirable and illegal.

The use of mineral oil for greasing tins and shapes in such quantity as to cause detectable amounts to be absorbed by the contents is open to the same objection.

Availability of Sugar-dried Egg

From the period commencing October 13 the allocation of dried egg for baking and manufacturing purposes was reduced from 100 per cent. of datum to 75 per cent. of datum. Of the new allocation a baker or manufacturer may take up to 11 per cent. in the form of sugar-dried egg. The 11 per cent. or any proportion thereof takes into account the sugar content, so as to ensure that a baker or manufacturer receives his full allocation of dried egg.

Agricultural Engineering Record

The National Institute of Agricultural Engineering intends to resume the publication of the *Agricultural Engineering Record* as a quarterly journal dealing with developments in the mechanisation of agriculture.

The contents of the first issue include among other matters an account of research into sugar-beet harvesting and the development of the use of segmented sugar-beet seed in this country.

The *Record* will contain accounts of the research and development work carried out at the Institute; and it is hoped that other workers in this field will also contribute to its pages. Space will gladly be provided for this purpose whenever possible.

The price of the *Record* will be 1s. per copy, or 4s. 4d. per year, post free. Subscriptions should be sent to the Secretary, National Institute of Agricultural Engineering, Askham Bryan, York; or to H.M. Stationery Offices.

Changes of Address

We have been notified of the following changes of address:

Import Licensing Department, Board of Trade, 189, Regent Street, London, W. 1. Tel.: Regent 4090.

Dehydration Division, Ministry of Food, Meteorological Building, Exhibition Road, South Kensington, London, S.W. 7. Tel.: Kensington 4533. Telegrams: Drykeepa, Southken, London.

Appointments and Resignations

Sir Frank Tribe has been appointed Permanent Secretary of the Ministry of Food in place of Sir Henry French, who is retiring.

Mr. G. S. Bishop has been appointed Private Secretary to the Minister of Food in succession to Mr. N. W. Damerell, who has been appointed Deputy Director, Bakery Division of the Ministry.

Mr. G. Seymour Noon has resigned his position as Director of Bread and Flour Confectionery in the Bakery Division of the Ministry of Food as from September 15. The Minister has expressed appreciation of the services Mr. Noon has rendered over nearly three years.

Sir John Bodinnar, who has given his services to the Ministry of Food throughout the war, first as the head of the Bacon and Ham Division, and since 1941 as the Commercial Secretary and head of the Supply Department, has asked to be released from his post on November 30 next owing to the pressure of private business, and the Minister has reluctantly agreed to his request.

Sir John, soon after the cessation of hostilities in Europe, arranged to leave the Ministry at the end of September, but at the request of Sir Ben Smith, Minister of Food, he agreed to prolong his service for a further two months. The post of Commercial Secretary will lapse after Sir John's retirement.

Lieut.-General Sir W. G. Lindsell has been appointed to secure the orderly release of factory space requisitioned for war purposes. This factory space is now urgently required for the expansion of home and export trade, and for implementing the Government's full employment policy.

Information about the derequisitioning of storage space should still be obtained from the Control of Storage Premises, Board of Trade, Millbank, or from the Board's regional controllers.

Mr. F. C. Parsons has been appointed Deputy Director of the Dried Fruits and Nuts Division of the Ministry of Food as from October 1, 1945.

Sugar for Bees

Bee-keepers may obtain supplies of sugar not exceeding 10 lb. per colony for the purpose of supplementing, where necessary, the store of natural food (honey).

Applications for permits must be made during the period August 31, 1945, to January 31, 1946, on the official application form which may be obtained from the local Food Office. After completion by the applicant the form should be countersigned by a responsible person and returned by the applicant to the Food Office.

If the general supply position admits, an allowance of sugar not exceeding 5 lb. per colony will be made available to bee-keepers, upon application during the period February 1 to May 31, 1946, for spring feeding.

Sales of Salvaged Foods

An Order has been made by the Minister of Food which will be known as "The Salvaged Goods (Terms of Sale) Order, 1945" (S.R. & O. No. 1091), prescribing the terms and conditions under which salvaged foods and feeding stuffs are to be sold.

The Order, which came into operation on September 9, 1945, relates only to salvaged goods sold as such in the first instance by the Director of Salvage of the Ministry of Food, and divides salvaged goods into four categories: "Disposal — Catering," "Disposal—Manufacturing," Salvage —Manufacturing," and "Salvage—Condemned Foodstuffs."

"Disposal—Catering" goods are intended for early consumption by catering establishments and institutions only and wholesalers who purchase such goods from the Ministry may resell them either directly to caterers and institutions or to other wholesalers or retailers for resale only to caterers and institutions.

"Disposal—Manufacturing" goods are meant for the manufacture of human food or drink as the case may be.

Goods sold under the above descriptions will be warranted by the Ministry for three months only.

"Salvage — Manufacturing" and "Salvage—Condemned Foodstuffs" goods are goods unfit for human consumption and are to be sold with all faults.

Sellers and buyers of salvaged goods are required to comply with the terms and conditions applicable to the sale of the goods by or to them and are required to keep appropriate records of their transactions in salvaged goods.

Information and Advice

Jelly Crystals and Lemonade Crystals

B.323. *Recipes required for the manufacture of jelly crystals and lemonade crystals.* (London.)

The following formulae were supplied:

1. Jelly Crystals.

28 lb. fine castor sugar
5½ lb. powdered gelatin
½ lb. citric acid (powder)
4 oz. essences

Rub the essences and colour (the latter dissolved in the minimum quantity of water) into the sugar, and pass the whole through a coarse sieve. Then add the gelatin and acid, mix again, and pass through the sieve once more to break up all lumps. The mixing should yield 136 pint packets at 4 oz. to the pint.

2. Lemonade Crystals.

95¾ lb. castor sugar
4¼ lb. tartaric acid
4 oz. colour
4 oz. lemon oil

The sugar and the tartaric acid are well mixed together and the colour and flavour added. The addition of a small quantity of soluble starch assists materially in the production of a non-sticky, free-running article, as it helps to absorb the colour and flavour, but it is liable to produce a slight cloudiness in the final liquid. The colouring matter used should be dissolved in water to full strength and should then have added to it about 50 per cent. of glycerine. The mixture should be sieved and bottled without delay.

Information Supplied

B.275. *Address required of the authors of a paper on pineapple dehydration.* (Yorks.)

B.276. *Foundation recipes required for making rissoles, vegetarian sausage meat, etc., similar to a number of proprietary articles.* (Staffs.)

B.279. *Manufacturers of oil expressing and refining plant.* (Venezuela.)

B.280. *Names and addresses of institutions preparing students in chemical engineering.* (India.)

B.283. *Information required regarding difficulties with sausage casings and texture.* (India.)

B.290. *Manufacturers of machinery for sterilising or pasteurising filled bottles of coffee essence.* (Ireland.)

B.291. *Names and addresses of suppliers of machinery used in the manufacture of meat pastes, pâté de foie gras, etc.* (Hants.)

B.292. *Details required of firms supplying labelling machines.* (Cheshire.)

B.293. *Names and addresses of manufacturers of biscuit machinery.* (Cyprus.)

B.294. *Full addresses of various firms required.* (Ireland.)

B.295. *Information required regarding the manufacturers of salinometers for testing pickles.* (Yorks.)

B.300. *Name and address of the manufacturers of machinery for grading, topping, and tailing stringless beans.* (Glos.)

B.301. *Names and addresses of suppliers of an open-type cardboard box for delivery of jam containing 12 × 2 lb. pots or 24 × 1 lb. pots.* (Ireland.)

B.302. *Manufacturers of the plant used in "A New Canning System" described in* FOOD MANUFACTURE, *May*, 1945. (Australia.)

B.303. *Names and addresses of firms who supply Heliotropin.* (Ireland.)

B.305. *Recipes required for the manufacture of baking powder, custard powder, and self-raising flour.* (Glos.)

B.306. *Information required regarding the manufacture of horse-radish cream, including the use of emulsifiers, and also the name of the manufacturers of Hydragum.* (Warwicks.)

B.307. *Information relative to the commercial use of garlic and the possibility of firms in Great Britain being interested in the import of carrageen.* (Ireland.)

B.308. *Names and addresses required of the manufacturers of first-class bakery engineers.* (Scotland.)

B.312. *Information required regarding the manufacturers of plant for essential oil (orange, lemon, etc.).* (India.)

B.313. *Name of a packing machine suitable for packing oat flakes and oatmeal.* (Lancs.)

B.314. *Names and addresses of manufacturers or suppliers of burnt sugar.* (Lancs.)

B.317. *Information required regarding machinery for the conservation and concentration "without fermentation" of fruit juice.* (Leicester.)

B.318. *Names and addresses of manufacturers of equipment for peeling onions.* (London.)

B.319. *Information required regarding suppliers of thermometers with flexible tubes.* (Ireland.)

B.320. *Enquiry as to the legality of the manufacture and wholesaling of flavoured and coloured gelatine.* (Ireland.)

B.322. *See B.318.* (Cumberland.)

B.324. *Names and addresses of manufacturers of machinery for stoning raisins.* (Lancs.)

B.342. *Information required regarding suppliers of laboratory apparatus for dehydrating fruit and vegetables for experimental purposes.* (British West Indies.)

B.343. *Manufacturers of the plant used in "A New Canning System" described in* FOOD MANUFACTURE, *May*, 1945. (New York.)

B.344. *Details required of suppliers of a raisin-stoning machine.* (Cumberland.)

Information Required

B.442. *Names and addresses of suppliers of brewery plant with a malt house to yield 3,000 gallons of beer per day.* (India.)

B.511. *Required: a second-hand copy in good condition of "The Englishman's Food," by J. C. Drummond and Anne Wilbraham.* (London.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

570,593. OLIVER, J. H. Apparatus for use on power-driven tractors for covering seed potatoes and for like purposes.

570,628. AVELING-BARFORD, LTD., and HENDERSON, W. M.: Potato-harvesting machines.

570,643. PATERSON, J. C., and BAKER PERKINS, LTD.: Packing of biscuits and other articles.

570,656. SPOONER, W. W.: Manufacture of foodstuffs.

570,695. WATSON, L. F.: Machine for distributing fertilisers and like materials.

570,698. PHIPPEN, A. J.: Machines for cutting cheese and like foodstuffs.

570,766. FORD, R. C.: Production of potato crisps, and the like.

570,809. CLARK, D. M. (Gorton-Pew Fisheries Co., Ltd.): Apparatus for removing scales from fish.

570,871. SMETHURST (FISH CURERS), LTD., H., SMETHURST, W. W. WARD, J. B., and WARD, F. W.: Processing of foodstuffs.

570,908. MCGEOCH, S. N., and IMPERIAL CHEMICAL INDUSTRIES, LTD.: Preparation of peanut protein.

571,184. MATHER AND PLATT, LTD., and JONES, T. M.: Machines for peeling vegetables.

571,209. WILLIAMS, W. P. (Procter and Gamble Co.): Process for altering the composition of fats and fatty oils for food and other purposes.

Abstracts of Recent Specifications

Improvements in the Production of Potato Crisps and the like

The object of the invention is to provide an improved method and means whereby the production of potato crisps and the like foodstuffs is facilitated and increased.

The method adopted is characterised in that the movement of a container into a receiving position with respect to a cutting machine automatically brings another container previously filled from said machine into a position with respect to means for drying the contents thereof, the arrangement being further such that initial movement of a filled container from the drying position enables an empty container to be substituted therefor, the subsequent completion of said latter movement bringing the empty container into the filling position with respect to said cutting machine.

The apparatus employed for carrying out the method above described may operate in different ways. In one form the movement of the container to and from the filling and drying positions may be rectilinear, while in another form the said movement may be rotational.

The slicing machine can be arranged to operate with the knife plate rotating in either a vertical or horizontal plane, the latter being preferred in at least one of the forms above described.

570,766. Reginald Clarence Ford.

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

LOVELL'S.—626,709. Sugar confectionery and chocolate confectionery (none being medicated). **G. F. Lovell and Co., Ltd.**, "Rexville," Albany Street, Crindau, Newport, Monmouthshire; Manufacturers and Exporters.

NUXO.—629,400. Vegetable preparations for food. **Harvo, Ltd.**, 257, Lawley Street, Birmingham, 4; Manufacturers.

WINTOX.—629,401. Vegetable preparations for food. **Harvo, Ltd.**, 257, Lawley Street, Birmingham, 4; Manufacturers.

AVOSET.—631,443. Cream containing a vegetable stabiliser. **Avoset Incorporated** (a Corporation organised and existing under the laws of the State of Delaware, United States of America), 24, California Street, City of San Francisco, State of California, United States of America; Manufacturers. Address for service is: c/o Haseltine, Lake and Co., 28, Southampton Buildings, Chancery Lane, London, W.C. 2.

KAM.—633,396. Canned cooked meats. **Canada Packers, Ltd.** (a Company incorporated under the laws of Canada), 2200, St. Clair Avenue West, Toronto, 9, Ontario, Canada; Canners. Address for service is: c/o Page, White and Farrer, 27, Chancery Lane, London, W.C. 2.

MÉMOIRE.—634,190. Chocolate and sugar confectionery (not medicated). **Chantry Trading Supplies, Ltd.**, Penton Hook, Staines, Middlesex; Merchants.

New Companies

Lewis Massarella and Sons, Limited. (397269.) 8, Cooke Street, Bentley, Doncaster. To take over bus. of an ice cream manufacturer and farmer carried on at Cooke Street Farm, Bentley, by Lewis Massarella, and the bus. of farmers carried on at Torworth, Notts, as "L. Massarella and Sons." Nom. cap.: £10,000 in £1 shares. Dirs.: L. Massarella and E. J. Massarella, both of 8, Cooke Street, Bentley, Doncaster; J. L. Massarella, Grange Farm, Torworth, near Retford.

R. V. Brayshaw and Son, Limited. (397275.) Beech Street Bakery, Barnsley, Yorks. To take over bus. of bakers, confectioners, grocers, etc., carried on as "R. V. Brayshaw and Son" at Barnsley. Nom. cap.: £3,500 in £1 shares. Dirs.: R. V. Brayshaw and Ellen Brayshaw, both of 125, Mount Vernon Road, Ward Green, near Barnsley; H. V. Brayshaw and Phoebe Brayshaw, both of 209, Sheffield Road, Barnsley.

S. Richardson (Garstang), Limited. (379278.) Garstang Mill, Barnacre-with-Bonds, Lancs. To take over bus. of a corn miller carried on as "S. Richardson" at Barnacre-with-Bonds. Nom. cap.: £4,000 in £1 shares. Dirs.: W. Sharples, Mary K. Sharples, and W. N. Sharples, all of 10, Bushell Place, Rushton; Jane Richardson, Mill House, Bond's Lane, Garstang.

Clarke and Blackwell, Limited. (397354.) 132-136, Lutterworth Road, Northampton. To carry on bus. of manufacturing confectioners, etc. Nom. cap.: £8,000 in £1 shares. Dirs.: G. Blackwell and Lilian Blackwell, both of 58, Berry Street, Northampton.

Refrigeration Electrical Mechanical Engineering Services, Limited. (397379.) Castle Street, Hinckley, Leics. Nom. cap.: £1,000 in £1 shares. Dirs.: J. Sullivan, 134, Strathmore Road, Hinckley; S. Lockley, 61, John Street, Hinckley.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.